

CONFIDENTIAL

25X1

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14 July 1967

Cy 1 of 2 cys

25X1

9618-14-67

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P.O. Box 8031
Southwest Station
Washington, D. C. 20024

25X1

Subject:

Gentlemen:

Enclosed herewith are three (3) copies of Installation Engineering Data and three (3) dimensioned outline drawings for this Project (9618), prepared in accordance with the requirements of Specification DB-1001.

Very truly yours,

25X1

Contracts Manager

c.c. Contracting Officer

THIS DOCUMENT CONTAINS INFORMATION AFFECTING THE NATIONAL DEFENSE OF THE UNITED STATES WITHIN THE MEANING OF THE ESPIONAGE LAWS, TITLE 18 U.S.C., SECTIONS 793 AND 794. ITS TRANSMISSION OR THE REVELATION OF ITS CONTENTS IN ANY MANNER TO AN UNAUTHORIZED PERSON IS PROHIBITED BY LAW.

GROUP 1
Excluded from automatic downgrading
and declassification

CONFIDENTIAL

INSTALLATION ENGINEERING DATADate form completed July 1967

(See Remarks at end of form)

Tentative ☒ Valid until 8/31/67Final data ☐

I. INSTRUMENT

A. Name of instrument: Photointerpretation Rapid Copy Viewer/Printer
 B. Manufacturer:
 C. Contract number:
 D. Delivery date: Tentative: 9/30/67 Final:

II. PHYSICAL FEATURES

A. Sub-assemblies:

1. Number of sub-assemblies: 2
2. Largest sub-assembly: Weight 600 lbs; 84 " H x 56 " W x 38 " D
3. Heaviest sub-assembly: Weight 600 lbs; 84 " H x 56 " W x 38 " D

B. Assembled instrument:

1. Number of major components: 6
2. Largest component: Weight 75 lbs; 15 " H x 20 " W x 28 " D
3. Heaviest component: Weight 175 lbs; 27 " H x 38 " W x 14 " D
4. Total floor space required after assembly, including maintenance access space. 7 Ft. 0 In. High x 7 Ft. 2 In. Wide x 4 Ft. 0 In. Deep.
5. Total weight of assembled instrument: 900 lbs.

C. Type of base of mount: Flat ; 3-point suspension ; 4-point suspension XD. Does the instrument have built-in mobility? Yes X No

E. Is the instrument particularly sensitive to vibration? Yes X No
 Will the instrument generate vibration? Yes X No

F. Are any special or unusual tools or fixtures necessary or advisable for the installation of the maintenance of this instrument? Yes No X.
 If "Yes," please describe:

III. UTILITIES

A. Electrical:

- | | | |
|--|---|---------------------------------|
| | <u>AC</u> | <u>DC</u> |
| 1. Voltage | <u>115</u> Volts / <u>10</u> Volts | <u> </u> Volts / <u> </u> |
| 2. Current | <u>30/1</u> Amps/phase | <u> </u> Amps |
| 3. Frequency | <u>60</u> cps | |
| 4. Nr. of phases | <u>1</u> Ph | |
| 5. Nr. of wires | <u>3</u> | |
| 6. Power required | <u>3500</u> Watts | <u> </u> Watts |
| 7. Power factor | <u>0.8</u> (Leading) (Lagging) | |
| 8. Type of outlet: | Two prong <u> </u> ; three prong <u> </u> ; Twist lock <u>X</u> ; Perm. <u> </u> | |
| 9. Type of ground: | Building conduit <u>X</u> ; Direct earth ground <u> </u> | |
| 10. Should the instrument be shielded, either from external electromagnetic signals or to prevent interference with other equipment? Yes <u> </u> No <u>X</u> | | |
| If "Yes," to what extent? | <u> </u> | |

B. Air conditioning:

1. Desired environment: Room air temperature of 70 °F / 5 °F and relative humidity of 40% / 10%.
2. Input Air: Is a direct connection necessary? Yes No X;
Adviseable? Yes No ; If "Yes," what is the connector type and size? Recommended input air temperature °F / °F.
Relative humidity % / %. If input air must be filtered, what is the maximum particle size in microns? What particle count? / cu. ft.
3. Output Air: Is a direct connection to the return air duct necessary? Yes No X. Adviseable? Yes No . Connector type and size? . Output air temperature °F / °F. Relative humidity % / %. Output heat BTU/Hr. Flow of CFM. Is output air toxic? Yes No ; Noxious? Yes No .

C. Plumbing:

1. Is water required? Yes No X; Pressure PSIG, flow GPM.
2. Type of water required: N/A
Tap °F / °F Deionized °F / °F
Tempered °F / °F Filtered °F / °F
If filtered, give maximum permissible particle size in microns and the maximum permissible count. microns particles/cu. ft.
3. Pipe required: N/A
Galvanized Copper Size
Stainless Steel Plastic Type of connector
4. Floor drain: N/A
Diameter of drain Galvanized drain?
Plastic drain? Glass drain?
5. Are any chemical solutions used in the device? Yes X No . If "Yes," state the nature of the solution(s), permissible temperature range, flow rate in appropriate units and the filtration necessary for each solution See Item #1, Chemical Solution - Proprietary photographic
6. Size of pipes and connectors .

D. Compressed air:

Is compressed air required? Yes No X. Water free? Oil Free?
Type and size of connector? . Pressure PSIG. Flow in CFM
Maximum , minimum , average .

E. Vacuum:

Is vacuum required? Yes No X. Pressure PSIA or (inches of water) (millimeters of mercury). Displacement in CFM, maximum , minimum , average . Type and Size of connectors .

F. Peripheral Devices:

Will the instrument be connected to any peripheral devices such as a computer or data input or data output device? Yes No X. If "Yes," give, in detail, the nature of the connection to the peripheral device such as coaxial cable, multiple wire connector, etc.

IV. REMARKS

- A. Use additional sheets if more space is required for environmental conditions or utilities not mentioned above.
- B. Submit three typed copies of the completed form to the Technical Representative.

INSTALLATION ENGINEERING DATADate form completed July 1967

(See Remarks at end of form)

Tentative ☒ Valid until 8/31/67Final data ☐

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 B. Manufacturer: [REDACTED]
 C. Contract number: [REDACTED]
 D. Delivery date: Tentative: 9/30/67 Final: [REDACTED]

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- A. Sub-assemblies:
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 2. Largest sub-assembly: Weight 600 lbs; 84 " H x 56 " W x 38 " D
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- B. Assembled instrument:
 1. Number of major components: 6
 2. Largest component: Weight 75 lbs; 15 " H x 20 " W x 28 " D
 3. Heaviest component: Weight 175 lbs; 27 " H x 38 " W x 14 " D
 4. Total floor space required after assembly, including maintenance access space. 7 Ft. 0 In. High x 7 Ft. 2 In. Wide x 4 Ft. 0 In. Deep.
 5. Total weight of assembled instrument: 900 lbs.
- C. Type of base of mount: Flat ; 3-point suspension ; 4-point suspension X
- D. Does the instrument have built-in mobility? Yes X No
- E. Is the instrument particularly sensitive to vibration? Yes X No
 Will the instrument generate vibration? Yes X No
- F. Are any special or unusual tools or fixtures necessary or advisable for the installation of the maintenance of this instrument? Yes No X.
 If "Yes," please describe:

III. UTILITIES

- A. Electrical:
- | | | |
|--|--|---|
| 1. Voltage | <u>115</u> Volts ^{AC} <u>7</u> <u>10</u> Volts | <u> </u> Volts ^{DC} <u> </u> |
| 2. Current | <u>30/1</u> Amps/phase | <u> </u> Amps |
| 3. Frequency | <u>60</u> cps | |
| 4. Nr. of phases | <u>1</u> Ph | |
| 5. Nr. of wires | <u>3</u> | |
| 6. Power required | <u>3500</u> Watts | <u> </u> Watts |
| 7. Power factor | <u>0.8</u> (Leading) (Lagging) | |
| 8. Type of outlet: | Two prong <u> </u> ; three prong <u> </u> ; Twist lock <u>X</u> ; Perm. <u> </u> | |
| 9. Type of ground: | Building conduit <u>X</u> ; Direct earth ground <u> </u> | |
| 10. Should the instrument be shielded, either from external electromagnetic signals or to prevent interference with other equipment? | Yes <u> </u> No <u>X</u> | |
- If "Yes," to what extent?

B. Air conditioning:

1. Desired environment: Room air temperature of 70 °F / 5 °F and relative humidity of 40 % / 10 %.
2. Input Air: Is a direct connection necessary? Yes No X ;
Adviseable? Yes No ; If "Yes," what is the connector type and size? Recommended input air temperture °F / °F.
Relative humidity % / %. If input air must be filtered, what is the maximum particle size in microns? What particle count? / cu. ft.
3. Output Air: Is a direct connection to the return air duct necessary? Yes No X . Adviseable? Yes No . Connector type and size? . Output air temperature °F / °F. Relative humidity % / %. Output heat BTU/Hr. Flow of CFM. Is output air toxic? Yes No ; Noxious? Yes No .

C. Plumbing:

1. Is water required? Yes No X ; Pressure PSIG, flow GPM.
2. Type of water required: N/A
Tap °F / °F Deionized °F / °F
Tempered °F / °F Filtered °F / °F
If filtered, give maximum permissible particle size in microns and the maximum permissible count. microns particles/cu. ft.
3. Pipe required: N/A
Galvanized Copper Size
Stainless Steel Plastic Type of connector
4. Floor drain: N/A
Diameter of drain Galvanized drain?
Plastic drain? Glass drain?
5. Are any chemical solutions used in the device? Yes X No . If "Yes," state the nature of the solution(s), permissible temperature range, flow rate in appropriate units and the filtration necessary for each solution See Item #1, Chemical Solution - Proprietary photographic
6. Size of pipes and connectors

D. Compressed air:

Is compressed air required? Yes No X . Water free? Oil Free?
Type and size of connector? . Pressure PSIG. Flow in CFM
Maximum , minimum , average .

E. Vacuum:

Is vacuum required? Yes No X . Pressure PSIA or (inches of water) (millimeters of mercure). Displacement in CFM, maximum .
minimum , average . Type and Size of connectors .

F. Peripheral Devices:

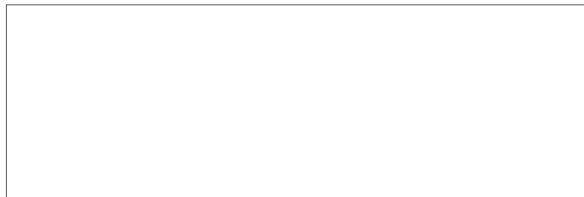
Will the instrument be connected to any peripheral devices such as a computer or data input or data output device? Yes No X . If "Yes," give, in detail, the nature of the connection to the peripheral device such as coaxial cable, multiple wire connector, etc.

IV. REMARKS

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- B. Submit three typed copies of the completed form to the Technical Representative.

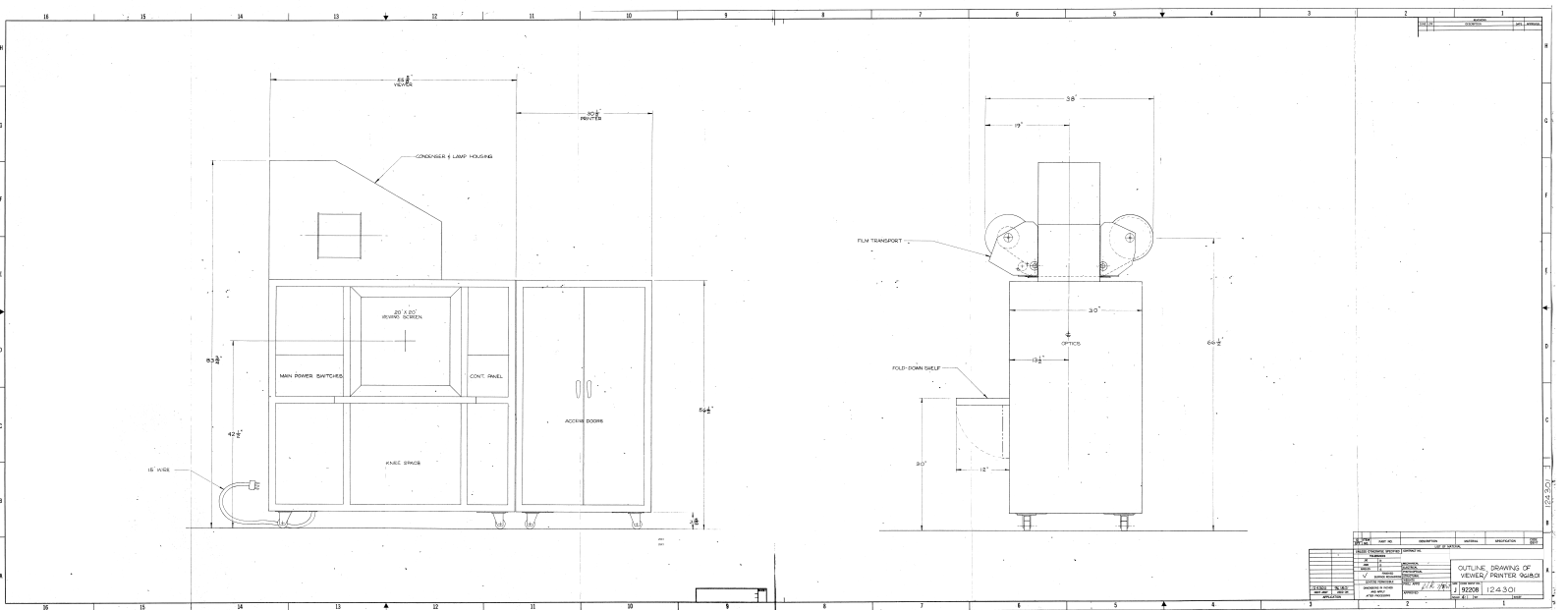
C. Attach three copies of a dimensioned outline drawing of each major component and of the completed assembly. Include the estimated weight of each major component and of the completed assembly. Indicate, on the outline drawing of the completed assembly, the space required for access to the instrument for maintenance.

D. If a question does not apply to the instrument, insert "N/A" (Not Applicable) in the appropriate blank space.



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Project Engineer
(Position or job title)



Page Denied

What Revised VU will do

1. meets all specs for magnification + copy material sizes + full ^{norm} light operation

2. more efficient

simplified operation

• 1 lens for all magnification

ease of loading

ease of centralized control

* Forward reflex mirror

Reliability

new processor + transport

integrated design

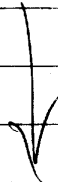
Labor Hours Summary - as noted

Completion Date + about 2 mos. stopped 8 Sept

Cost Summary

(same as in paper)

What Get for new cost?



Motorized Vehicle

valley part
etc

1. ? compare specs - / same as we needed.
2. How did we get so far off track in cost + not known

Q. why take is long to notify us John

A. Very slow delivery on components, interface problem not known - copy, head utilization costs not known - still don't have.

- Modified platform unit true
- Suddenly fired hours of engineering
 - Check out - early in game
 - H. engineering hours not build up, avoided by cancellation by Parkinson of film problem
 - forced earlier + pass on to us?

- cost to complete?
- long time per \$100
- Purchase of components + parts - costs
- this point in time really a much more time -

A. about 60% through ~~del~~ (talk about this case)
-- the long time to complete -- per minute

accuracy of estimate.

A probability of success = A very good. (we could)

~~C. in some way~~

redaction?

drawings

(call for working drawings)

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Publication 200 hrs

Crye 100 - 200

Installation - call ahead ✓

connect to F.P. ✓

Requester then - review red. & c.

P.I. Print EnlargerPerformance Specs - (Difference)

Size of film = chip loading (automatic)
 output print = 20x20 cut sheet & 10x10

magnification

automatic control

cassette loading

mounting data - leveling jacks

Size of Comp - 86" x 38" x 83 3/4" (ht.)

output print, cost saving, ease of
 handling, reduction in print area
 area selection of large format

magnification reduced width of frame
 better human ^{eye} _{exposure} overall config.
 better access to chip

Exposure control.

mounting data - better alignment

Problem Areas

Condenser Design

chip mechanism -

capping shuttle

10x10 print

internegative material, (change trip, light
 levels etc - investigated)

Areas of Consideration

Cost

increase in material cost
 impact of material change
 increase in overhead + G + A

Film Chip Mechanism

anticipated use of standard design
 loading & unloading
 maintain image quality
 maintain registration

10X10 Prints

Human Engineering
 (See report)

Automate & Process Control

Semi auto originally
 Eng. investigation
 interface mech.
 " elec
 " process

Status

Eng	85%
Des & Draft.	80
Procure mat	75
Mkups	35
Assembly	10
Test	20

Questions to be answered

- What are we getting for our money?
- Relating costs to the finished product?
- magnitude of changes involved
(built something better than we wanted)?
- Did they stay within the "oral agreement not requiring approval".

They found out that much of original ^{component part} equipment ~~was~~ ^{was} not satisfactory, later - so ~~was~~ redesigned.

Statement

- Review by higher authority
- not believe 50% increase in by premium
- asked policy level at State to show some of their stated costs -
- asked to designate areas that could be reduced.

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11 August 1967

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Processor is completed

Design nearly complete - 5% of detailing remaining
90% or more parts have been released
15-80% of released parts have been received

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ASSEMBLY

{ Quality control
Quality assurance
Publication

25X1

Page Denied

8 Sept.

J. R. P.

9619

Viewgraph ~~Maker~~.

Range of copy sizes & magnif. could not be accommodated using
std platemaster

Room light loading req'd special design

Mag. range req'd redesign of optical head, copy boat orientation
& elevator mechanism & re-orientation of magazine film path

Reflex & viewing port operationally impractical using horiz.
optics of std platemaster.

2714 des. & drafting

902 engr.

10-15 to 11-17

JRP

9618

PI Viewer Printer

Performance Spec. Improvements
 Output print size
 cost saving mtl.
 ease of handling

Problem Areas

Condenser design

Clip Mechanism

Capping shutter

10x10 print

internegative mtl.

when

dropped a ~~computer~~ ^{diffusion transfer} will planned

for use, time was spent in checking on new mtl.

4427 to 2427

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Areas of Consideration

Cost

increase of mtl costs

impact of mtl change

G&A & overhead rates

4427-26127

Film Clip Mechanism

anticipated ease of std design

loading & unloading

maintain image quality

maintain registration

X translation of clip

10x10 prints

original proposal 20x20 only

adjustable loading control

Auto. exposure control

semi-automatic originally considered

Misc.

adjustable masks

exposure platen

10"-20" pilot light automatic

corner marking 10x10

rotating & flipping mirror

3 folding mirrors

STATUS

Engine	85% complete
Des & Drafting	80
Procurement	75
Mfging	35
Assembly	10
Test	0

Sept 28, 1967

Include proposal.

we could not support their claims

we asked them to reduce costs

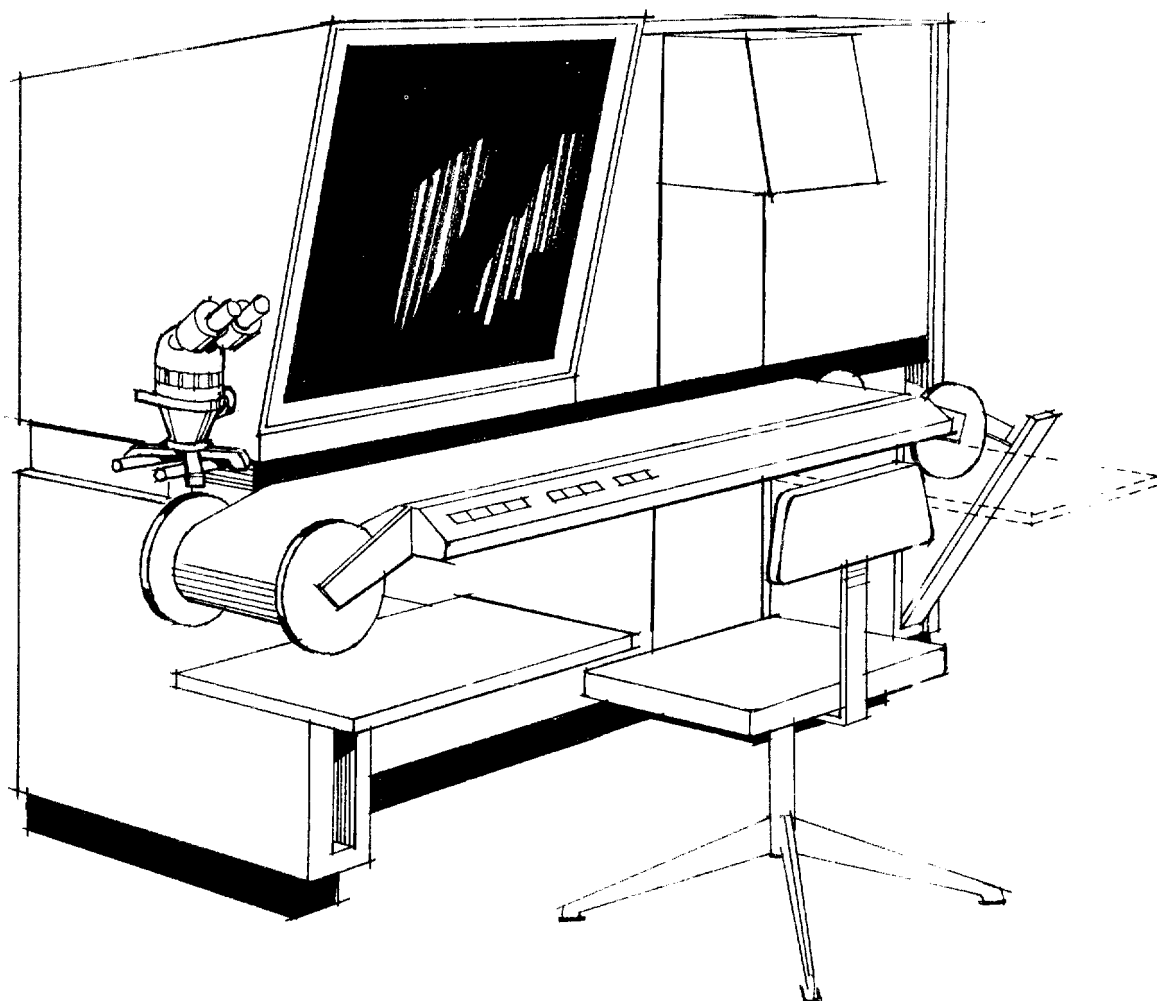
agency audit - we did not tell

technical as well as policy

hand carried

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VIEWER-PRINTERS



Models

3002 Multimagnification Screening Viewer-Printer

3003 Viewer-Printer

3004 Photointerpretation Rapid Copy Viewer-Printer

3005 Modified 18·24 Reader-Printer*

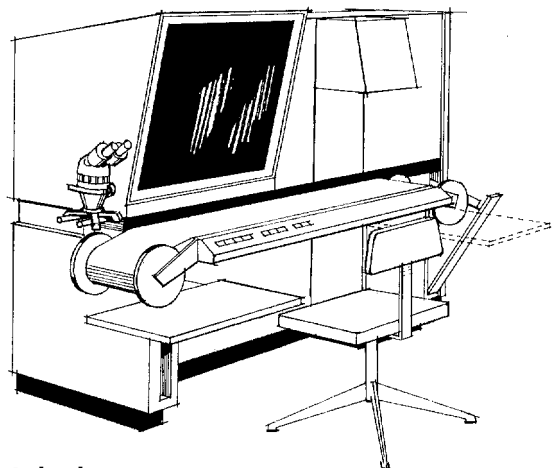
*Patent Nos. 3173577, 3240115 and others pending

1st article now being fabricated under RADC contract

25X1

Multimagnification Screening Viewer-Printer, (Model 3002)

25X1



- Direct viewing
- Multimagnification rear projection viewing
- Detail (microscope) viewing
- Annotation capability
- Positive printout of screened image

25X1multiformat film transport

The ☐ MSVP is a specialized item of equipment providing all of the viewing functions required for complete photointerpretation of multiformat input imagery and for operator annotated prints of selected frames within 30 seconds of the operator's print request. The MSVP permits viewing and annotation in three modes: (1) direct viewing, (2) rear projection viewing at 2X, 4X, 7X, 23X, and (3) either stereo or conventional detail viewing with a zoom microscope. Illumination and resolution are extremely high and uniform across the format for all viewing modes. Input imagery in widths of 9.5, 6.6, or 5 inches, and multiweb at 70 millimeters can be accommodated. The printer module permits positive to positive and negative to negative (i.e., reversal) reproduction of any imagery being screened in the rear projection viewing mode. Reproduction is in the form of damp-dry prints of either 10- by 10-inch or 20- by 20-inch 25X1, as desired.

DESCRIPTION

The ☐ MSVP satisfies the exacting viewing and printing requirements of most present photointerpretation facilities. This instrument comprises two modules: a viewer and a printer.

Viewer

The viewer module features direct, multimagnification projection, and detail viewing; high level illumination and an annotation capability in all three modes; relatively high resolution and uniformity of light distribution across the image format; accommodation of a wide range of input formats; 2X, 4X, 7X, and 23X magnification; full screen viewing at each magnification; automatic or manual exposure control with exposure timer for the manual mode; variable screen brightness control over the range of 40 to 400 foot-lamberts; and operation from a sitting position.

The MSVP meets all viewer requirements through use of an illumination system based on years of experience with ☐ highly successful AM-4 rear projection viewer; a double-fold, high resolution optical system using commercially available lenses and packaged in a console measuring only 48 by 72 by 34 inches; a precision film transport system having a wide range of scan and slew speeds and precise control of film motion at low velocities; precision film support throughout the film path to ensure freedom from film scratching, abrading, or other degradations; front panel operator controls that are human engineered for minimum operator motion and maximum overall operational efficiency in all viewing modes; internal construction featuring high reliability and ease of maintenance; and loading and operation under normal room illumination.

Printer

The printer module, although designed for operational and external compatibility with the viewer of the MSVP, is a customer option in that its elimination will not affect viewer performance other than in recording capability. The printer comprises an exposure platen, intermediate negative film transport, positive film transport, processing assembly, and plumbing utilizing a diffusion transfer printing technique.

DIRECT (LIGHT TABLE) VIEWING

A conveniently located light table at the operator's station permits direct viewing and target selection on the multiformat input imagery. Opaque masks may be translated into position to eliminate excessive glare from any unused portions of the table, whose brightness is adjustable from the viewer-printer's control panel. The light table will be at least 30 inches long and will provide for x and y coordinate readout.

REAR PROJECTION VIEWING

The rear projection viewing system has four individually selectable magnifications: 2X, 4X, 7X, and 23X. With the photointerpreter seated in a normal operating position, the 20- by 20-inch Polacoat viewing screen is at a comfortable viewing angle. Provision is made for operator annotation of any imagery seen in the projection mode.

DETAIL (ZOOM MICROSCOPE) VIEWING SYSTEM

The MSVP is normally supplied with the mount and an X Y stage for microscope translation over the light table, but not the microscope. The mount may be designed to accept either conventional or stereo microscope assemblies. The customer can select such special features as image rotation or any required range of zoom magnification as specified.

ILLUMINATION SYSTEM

The illumination system for the MSVP uses a 1,500-watt projection lamp and a multilens condenser assembly having automatically interchanged lens elements that optimize the condenser for each of the four magnifications.

The MSVP optical system comprises a lens selection assembly, two folding mirrors (one adjustable to allow printout), and a 20- by 20-inch Polacoat rear projection viewing screen.

FILM TRANSPORT SYSTEM

The film transport system accommodates film widths from 70 millimeters through 9½ inches and film lengths up to 1,000 feet. The input film transport allows for control panel operated translation of the input imagery in any of the viewing conditions. The transport system is joystick operated during scanning and slewing. A footage indicator (accurate to approximately 0.1 percent), together with the x and y position indicators enable precise target positioning on the viewing screen crosshairs for high magnification and/or printing. The speed and direction of film movement are governed by the joystick. A bidirectional film motion capability permits the operator to select the required viewing position.

CONTROL PANEL

All controls on the viewer-printer's control panel are positioned for maximum operator convenience and efficiency. Individual controls are provided for each viewing mode.

DIFFUSION TRANSFER REVERSAL PRINTER-PROCESSOR

The optional capability for direct positive to positive print-out of screen images necessitates the inclusion of a processor package placed at the right of the console. This package consists of an exposure platen, an intermediate negative film transport, a positive material film transport, a processing assembly, and associated plumbing. Actuation of the printing and processing cycle is accomplished at the control panel. The output print is within easy reach of the seated operator. Automatic exposure control is provided. However, a manual override allows the operator to select the required exposure parameters. Output print sizes may be either 10 by 10 inches or 20 by 20 inches. The photosensitive intermediate negative is cassette loaded and may be inserted into the equipment under room light conditions. The positive diffusion-transfer reversal material (not light sensitive) may be loaded into the MSVP under room light conditions. The nominal processing time for the output positive is approximately 30 seconds. The system design provides for continuous viewer-printer-processor operation for up to 100 prints, each 20 by 20 inches, without requiring a change of chemical solution. Prints are delivered in damp-dry condition (similar to Verifax-type office copies). The output material must be peeled from the negative material.

MAINTENANCE OPERATION

All maintenance and operating procedures are accomplished from the front of the device. The externally mounted film spools permit convenient front loading and provide the maximum clear work area required for the handling of large format, heavy spools. The projection viewer-printer may be flush mounted against a wall. The condenser and light source for the viewer-printer are located at the lower right of the console; both are easily accessible from the front.

MILITARIZED VERSION

Field operated equipment should be as basic in configuration and construction as is possible without sacrificing its primary purpose. In photointerpretation viewers used primarily

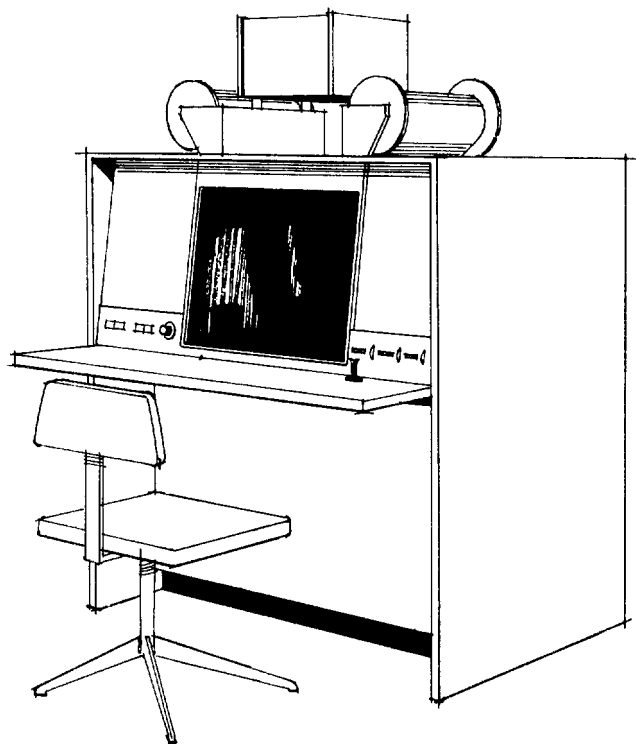
for rapid extraction of intelligence information, it is of little value to save several seconds by automating all controls and then have the equipment unreliable as a result of the added complexity. Therefore, upon customer request, the MSVP will be configured to provide manual control of such functions as lens positioning, lateral film translation, mirror rotation, etc., or manual backup controls for any automatic functions used.

SPECIFICATIONS

Input film sizes	70 millimeters to 9½ inches, up to 1,000-foot spool capacity
Output print size (optional)	20- by 20-inch cut sheets 10- by 10-inch cut sheets
Viewing characteristics	
Magnification	2X, 4X, 7X, 23X* (selectable)
Light source	G.E. 1500T24/15 lamp
Input format	
2X	9 by 9 inches
4X	5 by 5 inches
7X	70 by 70 millimeters
23X	0.9 by 0.9 inch
Lenses	
2X	600-millimeter, f/9 Apo-Nikkor
4X	450-millimeter, f/9 Apo-Nikkor
7X	300-millimeter, f/9 Apo-Nikkor
23X	105-millimeter, f/5.6 Schneider Componon
Resolution at output platen, lines per millimeter	
2X	10
4X	10
7X	10
23X	7
Exposure control	Automatic with manual override
Screen brightness range	40 to 400 foot-lamberts
Uniformity of illumination	Varies by less than 20 percent across format
Controls	
ON-OFF	All circuits energized in the power-on condition
Print (optional)	Pushbutton to initiate printing cycle
Footage Indicator	Bidirectional display
X Indicator	Resettable for each frame
Y Indicator	Nonresettable, ± indication of distance from optical centerline
Magnification Selection	Semiautomatic
Brightness	Variable
Mirror Control	Automatic
Exposure Control	Manual, or automatic
Exposure Timer	Used in "manual" exposure-control mode only
Installation data	
Operating conditions	Room light operation, room light loading
Mounting data	Locking-type caster
Weight	900 pounds
Power	115 volts, 60 cycles, 20 amperes
Viewer dimensions (W, H, D), inches	48 by 72 by 34
Printer dimensions (W, H, D), inches	24 by 72 by 30

*Will consider customer requests for replacing the 23X magnification with some other magnification.

Viewer-Printer, (Model 3003)



VIEWER-PRINTER

- Multiformat input roll film viewing
- Multiformat input film chip viewing
- 2X, 4X, 7X, and 10X magnification for viewing and printing
- Image rotation

25X1 10- by 10-inch and 20- by 20-inch negative prints

Model 3003 Viewer-Printer is designed for versatility in meeting a wide variety of military and commercial photographic evaluation requirements.

The unit features automatic lens selection, choice of input film size, full format coverage for high magnification viewing and printing, choice of two negative-film copy sizes, and image rotation capability — all completely controlled by one seated operator.

FILM SIZE

The viewer-printer is designed for projection viewing and printing of 70 millimeter to 9 1/2-inch-wide film mounted on spools up to 1,000 feet in length and multiformat film chips.

MAGNIFICATION SELECTION

Automatic lens and condenser indexing controls provide rapid selection of any of four prefocused lenses for 2X, 4X, 7X, and 10X magnification of the input format onto the 20- by 20-inch viewing screen or the printing platen.

IMAGE ROTATION

Image rotation of ± 185 degrees is provided by mounting the entire input platen on a rotatable circular table driven by a dynamically braked motor controlled from the operator's panel.

NEGATIVE PRINT SIZE

The viewer-printer provides negative prints of 10- by 10-inch and 20- by 20-inch sizes with a changeover downtime of less than 5 minutes. All changeover elements are built in, precluding problems of external storage and handling.

FILM TRANSPORT

The input film transport accommodates 1,000-foot spools of film varying in width from 70 millimeters to 9 1/2 inches. The film is transported in either a scanning mode for continuous viewing and target positioning or in a slewing mode for rapid format selection or rewind. In the scan mode the film is transported by means of a capstan drive whose speed is variable from 0.1 to 5.0 inches per second.

A pair of dynamically braked torque motors is used for forward and reverse direction spool driving, i.e., x-axis position control. Translation in the y axis is accomplished by moving the entire input assembly which is mounted on linear ball bushings and driven by a reversible torque motor through a rack and pinion combination. Orthogonally mounted ball slides allow for translation of the complete assembly along the x axis to allow for film chip scanning.

INPUT FILM PLATEN

The input platen design consists of an electrically operated pressure plate assembly which clamps the film against a reference surface plate for static viewing and printing. The pressure plate is released during film advance. A pair of guide rollers maintain the emulsion side of the film approximately 1/32-inch away from the reference plate to prevent film scratching. To eliminate some of the threading problems inherent in conventional pressure plate designs, the reference plate is hinged, providing complete access for loading and threading the film. After the threading operation, the reference plate is manually returned and securely fastened to the input platen. Elimination of Newton ring interference patterns has been achieved through careful design of the pressure plate.

OUTPUT PRINT STAGE

Output printing is accomplished at a vacuum platen assembly in the base of the viewer-printer console. Upon completion of the exposure cycle, the output stage drive system automatically indexes the spooled film negative supply. The exposure cycle is determined and selected by the operator with the help of the exposure meter probe and selector guide, located on the left side of the control panel.

Photointerpretation Rapid Copy Viewer-Printer, (Model 3004)

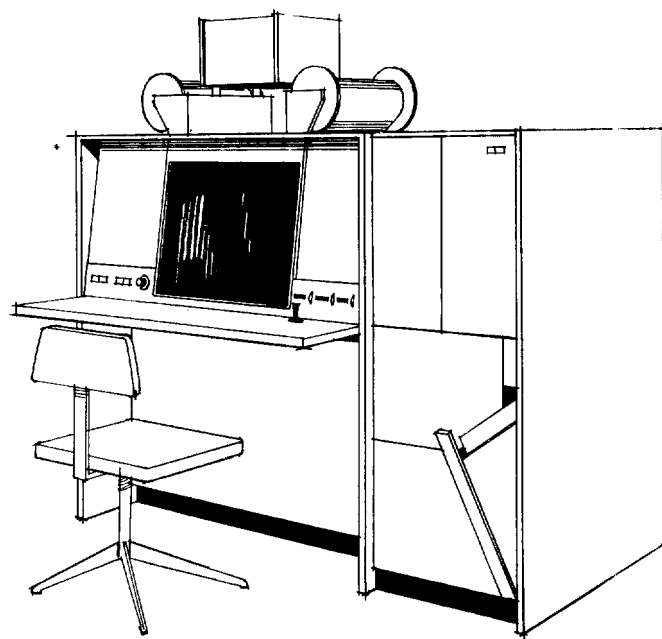
*development program
will be cancelled by
customer!*

OPTICAL SYSTEM

The optical system includes four prefocused lenses and associated condensers which are automatically positioned by the operator. When the operator selects the desired magnification, the correct lens of the lens assembly and the correct elements of the multilens condenser are positioned automatically. For the printing mode, the mirror is hinged out of the optical path, providing a direct light path to the output print platen. A light shield is incorporated to prevent film exposure until the mirror is completely out of the path, at which time the automatic exposure cycle is enabled.

SPECIFICATIONS

Input film sizes	70 millimeters to 9½ inches, up to 1,000-foot spool capacity or film chips
Output print size	10 by 10 inches or 20 by 20 inches
Printing and viewing characteristics	
Magnifications	2X, 4X, 7X, 10X
Light source	G.E. 1500T24/15 lamp
Input format	
2X	9½ by 9½ inches
4X	5 by 5 inches
7X	2.8 by 2.8 inches
10X	2.0 by 2.0 inches
Lenses	
2X	f/5.6, 300-millimeter focal length, Schneider Componon
4X	f/5.6, 210-millimeter focal length, Schneider Componon
7X	f/5.6, 150-millimeter focal length, Schneider Componon
10X	f/8, 111-millimeter focal length, Goerz Wide-Angle Golden Dagor
Resolution measured at output platen	
2X, 4X, 7X	10 lines per millimeter
10X	7 lines per millimeter
Exposure control	Manual
Viewing screen brightness	40 to 400 foot-lamberts
Brightness control	Panel mounted
Controls	
On-Off	All circuits energized in the "power-on" condition
Print	Push button to initiate printing cycle
Footage Indicator	Bi-directional display
X Indicator	Resettable for each frame
Y Indicator	Nonresettable, ± indication of distance from optical centerline
Magnification Selection	Automatic
Mirror	Automatic
X and Y Translation	Manual
Installation data	
Operating conditions	Room light operation, safelight loading
Mounting data	Locking-type casters
Height	76 inches
Width	48 inches
Depth	48 inches
Weight	900 pounds
Power	115 volts, 60 cycles, 20 amperes



- Rapid access 10- by 10- or 20- by 20-inch prints
- Multiformat input
- Positive to positive prints
- Choice of five magnifications
- Automatic prefocus
- Calibrated exposure controls

The ☐ Photointerpretation Rapid Copy Viewer-Print25X1 is a highly versatile, single console instrument providing rapid access to 10- by 10- or 20- by 20-inch damp dry prints for tactical briefing conferences. The viewer-printer accepts either chip or roll film input photography in standard widths from 70 millimeters to 9½ inches. This imagery is projected at any of five magnifications (2X, 4X, 7X, 10X, and 20X) onto a 20- by 20-inch viewing screen. A two-speed film transport system with y-axis translation capability permits the selection of any portion of the input material for viewing and printing. The printer module employs a diffusion transfer reversal (DTR) process to produce positive to positive prints. All operating controls are conveniently located within easy reach of a seated operator.

OPERATIONAL CHARACTERISTICS

The ☐ Photointerpretation Rapid Copy Viewer-Pri25X1 satisfies the film editing and copying requirements of most photointerpretation facilities. Primary emphasis is placed on simplicity of operation, both in preliminary loading functions and in equipment control and manipulation. Photographically trained personnel are not required for operation and maintenance.

Photointerpretation Rapid Copy Viewer-Printer, (Model 3004)

PROJECTION SYSTEM

The projection system consists of a light source, condenser assembly, film platen, projection lens assembly, front surface folding mirror, and a viewing screen. The total optical path is 54 inches. The film image is picked up directly by the appropriate projection lens and is directed to the folded mirror and onto the rear surface of the Polacoat viewing screen. In the printing mode, the mirror rotates 90 degrees, reflecting the image to the printing plane. Five magnifications are provided through the use of five projection lenses and seven condenser lenses.

OPTICAL SYSTEM

Optically, the viewer-printer is a straightforward system. Resolution ranges from 10 lines per millimeter at 2X to 5 lines per millimeter at 20X with commercially available optics. A single folding mirror presents the image in its proper orientation to either the screen or the intermediate negative. The projection lenses (one for each magnification) are all mounted to a common turret, and upon the operator's command are rotated into place. The lenses are prefocused, although a manual fine focus adjustment is provided.

PRINTER-PROCESSOR

The printer-processor section is a self-contained unit located adjacent to the viewing and projection unit. The printer-processor unit consists of a cabinet containing the processor, the solution supplies, the positive paper roll, the power supply, and a light-tight area for holding the laminated positive and negative sandwich. The processor unit is fed from disposable containers. No handling of solutions is ever required.

The cabinet serves as a base to an upper structure containing the negative film supply and the exposure platen. Once the printing mode is activated, the transport mechanism of the processor operates automatically, correctly exposing the image area, advancing the positive and negative material through the processor, and depositing laminated sheets in the light-tight compartment. The sheets are then hand stripped.

FILM TRANSPORT

The joystick operated film transport permits low magnification scanning of input film negatives with provisions for increasing the magnification level for detailed study of particular areas of interest. Bidirectional motion capability is included in the design of the transport in order to move any target area into the center of the screen prior to high magnification viewing. The design provides for rapid traversing in two directions as well as precision motion control for accu-

rately positioning the target area on the viewing screen cross-hairs. The input film transport accommodates 1,000-foot rolls of film varying in width from 70 millimeters to 9 1/2 inches. The film is transported in two modes — scanning for continuous viewing and target positioning and slewing for rapid format selection and rewind. Scan speed is variable from 0.1 to over 5.0 inches per second. Tension is maintained on the film by torque motors controlled by the amount of film on each spool. Movement of the joystick forward or backward releases the plate and transports the film in the direction of joystick movement.

Y TRANSLATION

Y translation of the entire film transport is provided to position any portion of the largest input film over the smallest printing aperture. The film transport and platen assembly are mounted on ball slides positioned laterally to the direction of film transport. Lateral motion is automatically controlled by the motion of the joystick.

CONTROL PANEL

The viewer-printer controls are located on either side of the viewing screen in functional groupings. The left-hand panel controls the viewer-printer functions, while the right-hand panel provides input film positioning controls. Auxiliary controls and indicators consist of low film warning indicators, a print counter, and a ready to print indicator.

ILLUMINATION

To satisfy the illumination requirements of viewing and printing conditions, light intensity is controlled by combining lamp voltage adjustment with a filter wheel introduced at the light source. This combination provides a more than adequate range of illumination for the two modes of operation.

FILM CHIP ACCOMMODATION

The film platen is positioned on sliding ways to enable the operator to extend it forward for placement of film chips which range in size from 70 millimeters square to 9 1/2 inches square.

PHOTOGRAPHIC CONSIDERATIONS

The printing process is a typical diffusion transfer reversal (DTR) process that produces a positive image from a positive image or a negative image from a negative image. The process is based on the use of a silver halide emulsion that is treated in a developing solution containing a silver solvent. The light sensitive component is exposed and processed in a device that simultaneously laminates the negative component to a nonlight-sensitive component on which a positive image is formed.

Modified 18-24 Reader-Printer* (Model 3005)

See other literature

SPECIFICATIONS

Input film sizes	70 millimeters to 9½ inches wide, up to 1,000 feet long
Output print size	10- by 10- or 20- by 20-inch cut sheet (damp dry)
Magnification	2X, 4X, 7X, 10X, and 20X
Light source	G.E. 1500T24/15 lamp
Input format	
2X	9 by 9 inches
4X	4.5 by 4.5 inches
7X	70 by 70 millimeters
10X	1.8 by 1.8 inches
20X	0.9 by 0.9 inch
Lenses	
2X	300-millimeter, f/5.6 Schneider Componon
4X	210-millimeter, f/5.6 Schneider Componon
7X	150-millimeter, f/5.6 Schneider Componon
10X	111-millimeter, f/8 Goerz Wide Angle Golden Dagor
20X	60-millimeter, f/5.6 Schneider Componon
Resolution at output platen	
2X	10 lines per millimeter
4X	10 lines per millimeter
7X	10 lines per millimeter
10X	7 lines per millimeter
20X	5 lines per millimeter
Printing and processing technique	Diffusion transfer process, positive to positive
Exposure time	Less than 1 second
Exposure control	Automatic
Screen brightness	40 to 400 foot-lamberts
Controls	
On-Off	All circuits energized in the power-on condition
Print	Pushbutton to initiate printing cycle
Footage Indicator	Bidirectional display
X Indicator	Resettable for each frame
Y Indicator	Nonresettable, ± indication of distance from optical centerline
Magnification Selection	Automatic
Mirror Control	Automatic
Brightness	Adjusts screen brightness
Operating conditions	Room light operation, safelight loading
Mounting data	Locking-type casters
Weight	900 pounds
Dimensions (W, H, D)	60 by 60 by 50 inches
Power requirement	115 volts, 60 hz, 20 amperes



- Continuous tone input imagery capability
- Automatic printout in 30 seconds
- Print size flexibility
- Convenient and easy to use
- No handling of chemicals
- 18- by 24-inch rear projection screen

The modified 18-24 Reader-Printer is a self-contained, fixed magnification unit capable of displaying the enlarged images of continuous tone and line film negatives and of rapidly printing and processing enlargements from these negatives. The Reader-Printer accepts aperture cards, acetate jackets, or roll film and accommodates a format size of 58 by 84 millimeters on a 70- by 100-millimeter chip. The image is magnified 6.7X for printing as well as for displaying on the 18- by 24-inch rear projection screen. Other magnifications or multi-magnifications can be supplied upon request.

DESCRIPTION

The Reader-Printer has been designed for convenient operation. The screen inclination and control panel layout permit comfortable viewing from either a seated or standing position, and the handling of chemical solutions has been eliminated through the use of disposable containers.

The printing cycle is automatic and lasts approximately 30 seconds, producing a stabilized photocopy whose dimensions can be varied from 18 by 24 inches to 11 by 8 inches through the use of various widths of roll stock in addition to a built-in print length selector. Furthermore, a masking feature permits cropping the length of the viewed and printed image independently of the length of the print. This feature can save a considerable amount of tracing time by enabling the user to delete selected areas for drafting in revisions prior to reproduction.

FILM CARRIER

The fingertip control film carrier accepts either aperture cards or acetate jackets. Control knobs move the carrier horizontally or vertically for scanning or adjusting the print margins.

*Patent Nos. 3173577, 3240115 and others pending

OPTICAL SYSTEM

The single-lens projection system provides uniformly high definition and illumination over the entire 18- by 24-inch format. A focal wheel permits quick refocus to compensate for minor variations in emulsion position, created by thickness of jacket or reversal of film for production of reverse reading intermediates.

EXPOSURE AND ILLUMINATION CONTROLS

Exposure timing is fixed. The illumination intensity from the fan cooled, 300-watt, 125-volt lamp may be varied by means of a rheostat control on the instrument panel to compensate for variations in film density. Thus the range of reproducible film is broadened and the reproduction quality improved.

VIEWING SCREEN

The screen is a rear projection type, with an 18- by 24-inch viewing area. It is inclined to permit comfortable viewing from either a seated or standing position.

PRINT LENGTH SELECTOR

The length of the print is variable from 8 to 24 inches, the length being set by turning a control dial. An automatic severing mechanism neatly separates the print from the roll at the preselected length. The width of the print is determined by the width of the roll of paper employed.

MASK

When prints with an image area less than 24 inches in length are produced, a mask plate screens off the unwanted area on both viewing screen and sensitized material. The mask may be set at any position by moving a fingertip lever on the control panel. The viewed image and the resulting projected print are identical in content. Calibrations at the bottom margin of the screen show the size of the image to be printed.

PRINT CYCLE

The fully automatic exposure and print processing cycle is initiated by operator control and lasts approximately 30 seconds. During 25 seconds of this time, the viewing screen may be employed for selecting the next image.

PROCESSING FUNCTION

The processing unit is fed from disposable containers. No handling of solutions is ever required. Raising the hinged reservoir automatically fills the processing unit; lowering the reservoir returns the chemicals to the containers for evaporation-proof storage when the Reader-Printer is not in use. The paper feed is automatic. The paper roll is loaded in a desk high storage box, easily accessible by lifting a section of the tabletop.

CONTROLS

The controls are conveniently grouped and located for easy access from either a seated or standing position. They include a power switch, input imagery position controls, fine focusing adjustment, illumination rheostat control, print length selector, mask position lever and calibrated scale, and automatic print cycle start control.

SPECIFICATIONS

Size of viewed image and print

Variable from 18 by 24 inches to 11 by 8 inches

Maximum image area

17 by 24 inches

Magnification

From 4X to 15X at customer option

Printing time

Approximately 30 seconds

Type of paper

Special negative-positive reader-printer paper (available in document weight or as translucent stock)

Type of print produced

Stabilized photocopy with continuous tone reproduction capability (image may be right reading or reverse reading, as desired)

Power

115 volts, 60 hz, 5 amperes

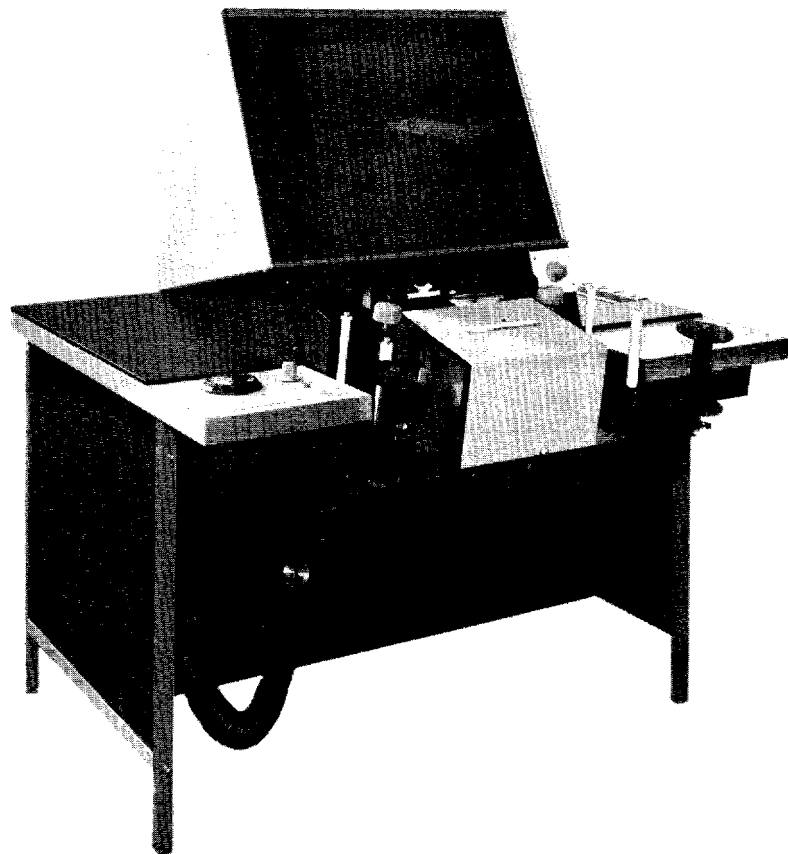
Dimension (W, H, D)

46 by 51 1/2 by 36 inches

Weight

350 pounds net, 520 pounds gross

*For additional information contact:
Graphic Information Systems Directorate*



VIEWER-PRINTER

*Production quantity of 23 new
being delivered to Navy. Follow-
on of 8 expected from Navy.*

25X1

Modified 18-24 Reader-Printer* (Model 3005)

- Continuous tone input imagery capability
- Automatic printout in 30 seconds
- Print size flexibility
- Convenient and easy to use
- No handling of chemicals
- 18- by 24-inch rear projection screen

The modified 18-24 Reader-Printer is a self-contained, fixed magnification unit capable of displaying the enlarged images of continuous tone and line film negatives and of rapidly printing and processing enlargements from these negatives. The Reader-Printer accepts aperture cards and acetate jackets, and accommodates a format size of 58 by 84 millimeters on a 70- by 100-millimeter chip. The image is magnified 6.7 X for printing as well as for displaying on the 18- by 24-inch rear projection screen. Other magnifications or multimagnifications can be supplied upon request.

DESCRIPTION

The Reader-Printer has been designed for convenient operation. The screen inclination and control panel layout permit comfortable viewing from either a seated or a standing position, and the handling of chemical solutions has been eliminated through the use of disposable containers.

The printing cycle is automatic and lasts approximately 30 seconds, producing a stabilized photocopy whose dimensions can be varied from 18 by 24 inches to 11 by 8 inches through the use of various widths of roll stock in addition to a built-in print length selector. Furthermore, a masking feature permits cropping the length of the viewed and printed image independently of the length of the print. This feature can save a considerable amount of tracing time by enabling the user to delete selected areas for drafting in revisions prior to reproduction.

FILM CARRIER

The fingertip control film carrier accepts either aperture cards or acetate jackets. Control knobs move the carrier horizontally or vertically for scanning or adjusting the print margins.

OPTICAL SYSTEM

The single-lens projection system provides uniformly high definition and illumination over the entire 18- by 24-inch format. A focal wheel permits quick refocus to compensate for minor variations in emulsion position created by the thickness of a jacket or for the reversal of film to produce reverse reading intermediates.

*Patent Nos. 3173577 and 3240115, and others pending.

EXPOSURE AND ILLUMINATION CONTROLS

Exposure timing is fixed. The illumination intensity from the fan cooled, 300-watt, 125-volt lamp may be varied by means of a rheostat control on the instrument panel to compensate for variations in film density. Thus, the range of reproducible film is broadened and the reproduction quality improved.

VIEWING SCREEN

The screen is a rear projection type, with an 18- by 24-inch viewing area. It is inclined to permit comfortable viewing from either a seated or a standing position.

PRINT LENGTH SELECTOR

The length of the print is variable from 8 to 24 inches, the length being set by turning a control dial. An automatic severing mechanism neatly separates the print from the roll at the preselected length. The width of the print is determined by the width of the roll of paper employed.

MASK

When prints with an image area less than 24 inches long are produced, a mask plate screens off the unwanted area on both viewing screen and sensitized material. The mask may be set at any position by moving a fingertip lever on the control panel. The viewed image and the resulting projected print are identical in content. Calibrations at the bottom margin of the screen show the size of the image to be printed.

PRINT CYCLE

The fully automatic exposure and print processing cycle is initiated by operator control and lasts approximately 30 seconds. During 25 seconds of this time, the viewing screen may be employed for selecting the next image.

PROCESSING FUNCTION

The processing unit is fed from disposable containers. No handling of solutions is ever required. Raising the hinged reservoir automatically fills the processing unit; lowering the reservoir returns the chemicals to the containers for evaporation-proof storage when the Reader-Printer is not in use. The paper feed is automatic. The paper roll is loaded in a desk high storage box, easily accessible by lifting a section of the tabletop.

CONTROLS

The controls are conveniently grouped and located for easy access from either a seated or a standing position. They include a power switch, input imagery position controls, fine focusing adjustment, illumination rheostat control, print length selector, mask position lever and calibrated scale, and automatic print cycle start control.

SPECIFICATIONS

Size of viewed image and print

Variable from 18 by 24 inches to 11 by 8 inches

Maximum image area

17 by 24 inches

Magnification

From 4 X to 15 X at customer option

Printing time

Approximately 30 seconds

Type of paper

Special negative-positive reader-printer paper (available in document weight or as translucent stock); an optional processor is available for handling high speed, high contrast Kodak Ektomatic paper

Type of print produced

Stabilized photocopy with continuous tone reproduction capability (image may be right reading or reverse reading, as desired)

Power

115 volts, 60 hz, 5 amperes

Dimensions (W, H, D)

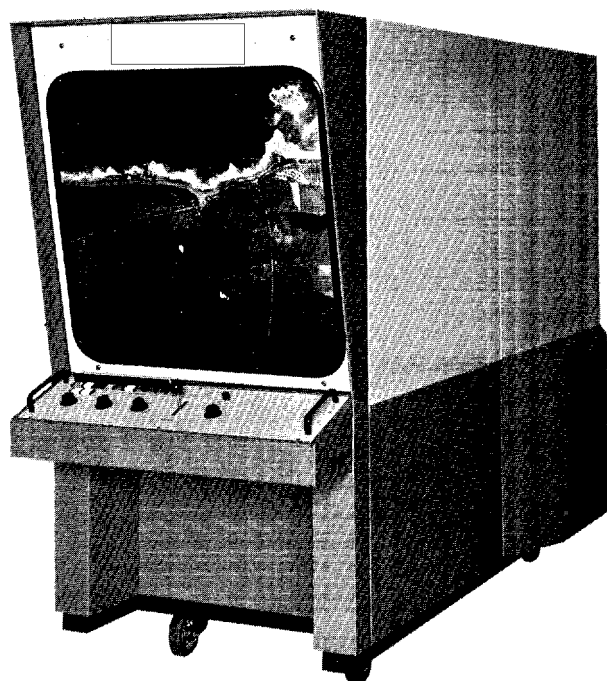
46 by 51½ by 36 inches

Weight

350 pounds net, 520 pounds gross.

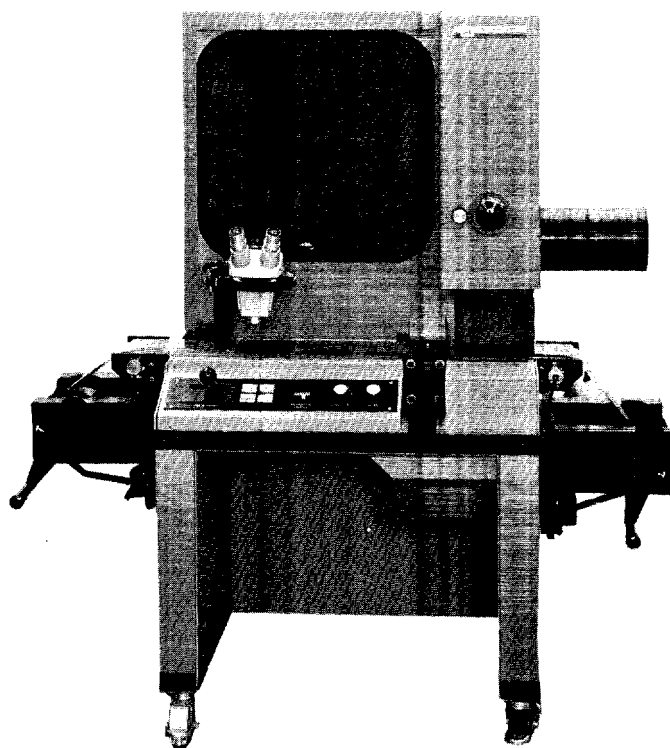
*For additional information contact:
Systems Exploitation Department*

*Almost out of production. Also known
as AM-4 (Army designation).
H-F Variscan is equivalent.*



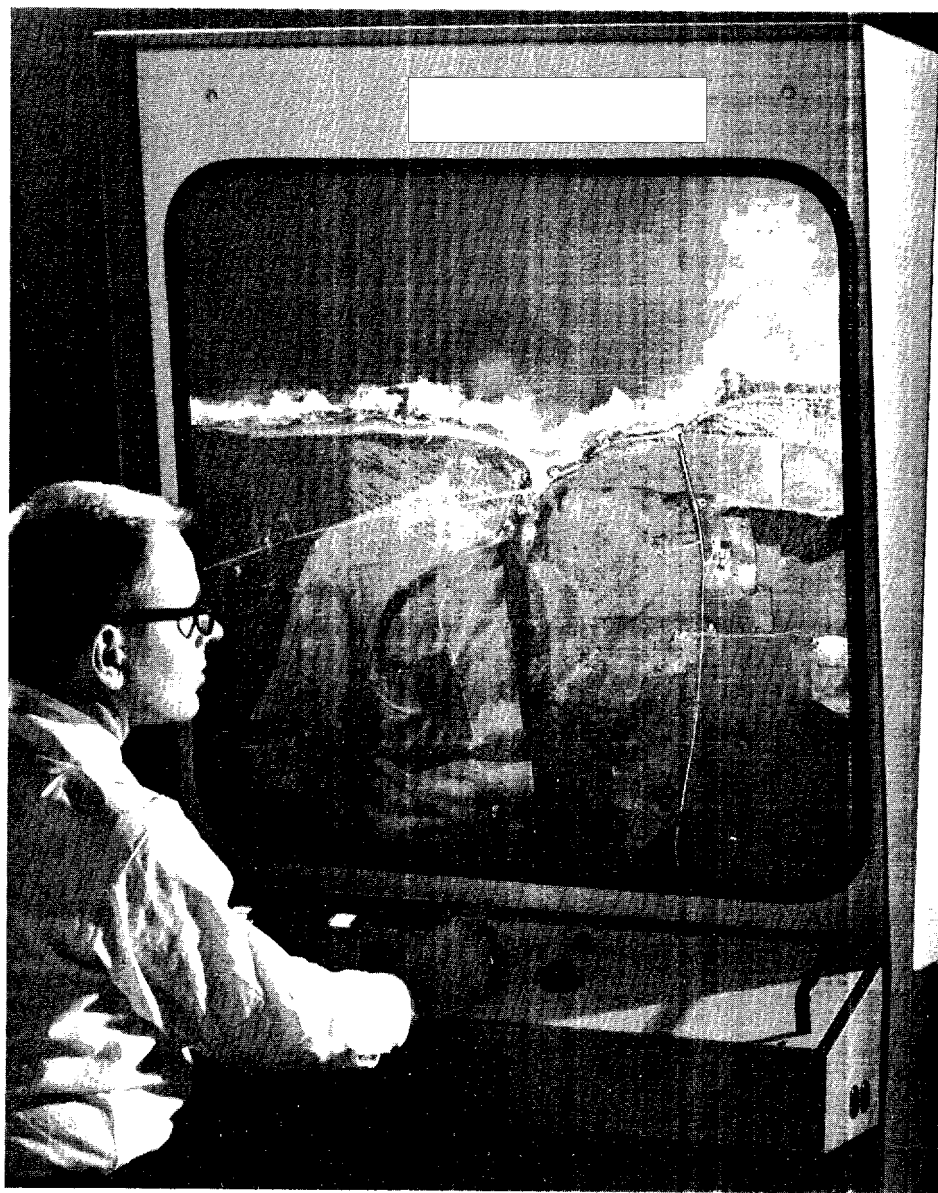
**Variable Width,
Rear Projection
Film Viewer
(Model 1001)**

*1 unit developed under RADC contract
F30602-67-C-0216. Now deployed
to SEA.*



**Rear Projection
Viewer
(Model 1002)**

Variable Width, Rear Projection Film Viewer (Model 1001)



25X1

- New order of speed and versatility for photointerpretation viewing
- 3X, 6X, 12X, and 30X magnifications (48X available on request)
- Input films from 35 millimeters to 9½ inches wide
- Front panel control of slew and scan velocity, y translation,

360-degree image rotation, magnification selection, focus, and screen illumination level

- 30- by 30-inch viewing screen
- Customer options — air-vacuum or pressure platen, 18-24 printer, Polaroid camera, X and Y mensuration, 48X magnification

DESCRIPTION

25X1 The ☐ Variable Width, Rear Projection Film Viewer incorporates unique features that introduce a new versatility and speed to photointerpretation film viewing systems. Located within immediate reach of the seated operator are controls for selecting magnification, adjusting focus, positioning film, setting illumination, and varying film speed, both slew and scan.

The film widths handled range from 35 millimeters to 9½ inches on reels up to 10½ inches in diameter. The four standard magnifications, 3X, 6X, 12X, and 30X, provide a clear, exact screen projection that maintains an even, sharp image.

25X1 The ☐ viewer is offered as a basic unit to which specific options and modifications may be added, depending on individual requirements.

25X1 The Variable Width, Rear Projection Film Viewer is a precision photointerpretation instrument produced in limited quantities. Incorporating techniques and refinements that reflect ☐ many years of experience in aerial reconnaissance and photo-optical ground handling equipment, this viewer makes available to photointerpretation facilities a new order of speed and versatility in the scanning of high resolution aerial photography. In addition, several auxiliary equipment options significantly extend the viewer's basic capabilities.

A key feature is the ease with which all loading, adjustment, and maintenance operations can be accomplished. For loading and routine adjustments, a remote control unit inside the optomechanical portion of the console provides all the necessary switches for energizing the console and for controlling the image motions normally initiated at the main control panel. Maintenance is simplified by installing the two electronic chassis on pullout slides. For more extensive troubleshooting and overhaul, the two chassis and the remote control box can be completely separated from the console and located anywhere within cable length.

The viewer presents an attractive exterior of modern design and rugged construction. The external configuration and all controls have been engineered for maximum convenience and simplicity of operation. The 42-inch-wide, 70-inch-high, 90-inch-deep structure weighs approximately 2,000 pounds. Passage through an average size doorway is made possible by the removal of side panel blisters to decrease the overall width to 34½ inches. Mounted on rubber-tired wheels, the instrument can be easily moved to new locations within a facility. Three jack-type isolators minimize the effects of external vibration and provide the means for leveling the console prior to use.

FILM AND FILM TRANSPORT

The viewer's film transport system is designed to handle 1,000-foot rolls of 5.0-, 6.6-, 8.0-, and 9½-inch and 35- and 70-millimeter film, on standard spools up to 10½ inches in diameter.

Accurate alignment of the capstan and film plane guides in conjunction with maintenance of proper film tension allows accurate tracking of all films. Thus, high inertia, stepped-side guide rollers are avoided.

The film transport of the viewer can operate in either the scan or the slew mode. Both modes are controlled by a joystick on the main panel. The operation of the platen is controlled by and synchronized with the operation of the film transport mechanism. Film damage is thus prevented by appropriate time delay relays and interlocks that control the platen and the film drive system.

In the scan mode, the film is advanced or retarded by a capstan whose drive motor is controlled by a precision velocity servo. The rubber-coated capstan drives the film at any selected speed from 0.1 to 4.0 inches per second (0.5 to 20 feet per minute). The use of a nonlinear potentiometer in the joystick extends the range of slow speed scan. Supply and takeup torque motors are used for film tension control and braking. Tension and load controls are provided to accommodate different film sizes.

In the slew mode, the film is advanced or retarded at speeds ranging from 10 to 50 inches per second, depending on the position of the joystick. Torque motor tensioning is automatic, as is braking between the slew and scan modes. During the slew mode, the capstan drive is automatically disengaged.

OPTICAL SYSTEM

The viewer's optical system comprises a light source assembly, a condenser assembly, a projection lens assembly, a front-surface folding mirror, a viewing screen, and a film platen. The overall length of the optical path is approximately 100 inches.

Light Source Assembly

The light source assembly is enclosed by a housing at the bottom of the viewer. The illumination source is a vertically positioned, 1,500-watt tungsten lamp. A reflector behind the lamp directs most of the backward radiated illumination through the first element of the condenser system and thence to a 45-degree dichroic mirror. The mirror passes the infrared component of the incident energy to a metal heat sink, while the visible component is reflected upward to a glass heat absorber, and thence to the condenser. Since the lamp filament can be aligned to the optical axis by adjustment of the folding mirror, no movement of the light source assembly is required.

(Model 1001)

The lamp can be turned on or off either from the main control panel or from the remote control panel by the use of two-way switches. The illumination level can be set from the control panel by a silicon controlled rectifier circuit, which varies the potential on the lamp to any desired level between 0 and 132 volts.

The lamp housing is held to a reasonable operating temperature by means of an exhaust blower that draws cool, filtered air through a rectangular port at the bottom of the console and into a labyrinth in the light source housing. The heated air is exhausted through a port in the lower left wall of the console. The blower system is activated by a thermal switch in the lamp housing.

Condenser Assembly

The condenser assembly is designed to produce extremely uniform, high intensity illumination across the entire viewing area at each magnification. This assembly consists of six lens elements, two of which are fixed — one adjacent to the lamp and one positioned directly under the platen. The remaining four elements, selected for each magnification, are carried on motor driven, sliding tables. When the operator presses a magnification selector button on the control panel, the proper combination of condensing lens elements is automatically driven into the optimum optical position.

Projection Lens Assembly

Four high quality lenses provide the magnifications without necessitating platen translation along the optical axis.

Magnification is changed by the rotation of a lens turret whose vertical drive shaft is supported by the left rear side of the cabinet frame. The shaft, which rotates on preloaded, precision bearings, carries four lens support arms. To eliminate optical degradations due to vibration, each arm is a rugged casting. The drive and positioning assembly at the top of the shaft consists of a sector disk gear whose positive locating stops are engaged by a solenoid activated detent and a small gearhead motor that drives the sector disk through a slip clutch.

When the operator presses one of the magnification selector buttons on the control panel, the drive motor automatically moves the turret as well as the condensing lenses to the proper positions.

Fine focusing is accomplished for each magnification by a four-speed, fine focus control that permits critical focusing for each magnification at a speed appropriate to that magnification. Fine focusing is controlled by means of an associated drive motor and a zero backlash coupling that move the entire lens shaft in a direction parallel to the optical axis.

Mirror

The 1-inch-thick front-surface folding mirror, coated with silicon monoxide, is mounted in a support frame fastened to

an extension of the viewer superstructure by means of a three-point adjustable mount. Localized slope deviations of the mirror surface do not exceed ± 3 fringes of green light per inch with respect to the average surface. The curvature is uniform (without inflection) and does not exceed 2 fringes per radial inch. To ensure freedom from chromatic aberration, the mirror surface is smooth and regular within $\frac{1}{8}$ fringe of green light for any 0.6-inch-diameter disk.

Viewing Screen

The Polacoat viewing screen is supported in a metal frame that can be tipped outward at the front for cleaning. The glass can be replaced by opening the self-locking rubber bezel by which it is attached to the frame. Tilt and z-axis adjustments of the screen are possible.

Film Pressure Platen

The standard pressure platen for the viewer is a three-position, automatically controlled film guide for adaptation to the viewing, scan, and slew modes. Both platen surfaces are positioned at the film plane during viewing; the upper platen surface moves away during scan and the lower surface moves away during slew. The film drive and platen control systems are interlocked to ensure that the film has stopped moving before the platen is closed for viewing, and a time delay in the film drive system prevents film transport while the platen is moving from the viewing (closed) to the scan or slew (open) position. The maximum time for platen cycling is less than 1 second. An air-vacuum platen (with associated air-vacuum supply) is available for applications in which the best possible resolution is required.

Platen Positioning and Stage Rotation

To accomplish the required image motion, it is necessary to move the film platen and film transport mechanism over a distance of $\pm 4\frac{3}{4}$ inches at right angles to the direction of film travel. The required translation is accomplished by means of a cast aluminum carriage, motor driven on precision ways, that supports the platen and the transport assembly. The transverse carriage ways and drive elements are mounted on a rotatable circular table supported by a large, precisely machined ring ball bearing mounted on the base casting.

COOLING SYSTEM

The cooling system includes two blowers. The light source is cooled by one of these, a squirrel cage blower that is mounted on the auxiliary chassis and exhausts through the left side of the cabinet. A flexible duct connects the blower to the exhaust plenum of the light source. A thermal switch in

the light box turns the blower off after the lamp is turned off and has cooled. Another thermal switch automatically shuts off the lamp in the event of cooling system malfunction.

The second blower cools the surface of the film platen and the condenser elements with filtered air drawn from the room; this air, after passing over the surfaces to be cooled, is retained within the console to pressurize it with filtered air.

MAIN CONSOLE STRUCTURE

The main console structure provides a stability comparable to that of an optical bench and minimizes the possibility of optical performance degradations as a result of vibrations.

Reinforced 16-gauge steel panels are used for the console skin. Full length doors provide access to the rotating stage,

film transport, and other components. An overhanging screen hood minimizes possible glare effects from overhead illumination.

OPTIONAL EQUIPMENT

The following items can be supplied with the basic viewer on customer request:

- Air-vacuum platen and air-vacuum supply (in lieu of pressure platen normally supplied)
- 18-24 printer assembly
- Polaroid camera assembly
- Mensuration assembly
- 48X magnification assembly

Costs for these ancillary items will be quoted upon request.

SPECIFICATIONS

Viewing screen

Polacoat

Viewing area

30 by 30 inches

Magnification

3X, 6X, 12X, 30X (48X optional)

Input film sizes

35 and 70 millimeters and 5.0, 6.6, 8.0, and 9½ inches; up to 1,000-foot rolls of normal base film

Film positioning modes

x axis (forward and reverse)

Scan

Variable, 0.1 to 4.0 inches per second (0.5 to 20 feet per minute)

Slew

Variable, 10 to 50 inches per second (50 to 250 feet per minute)

y axis (transverse)

±4¾ inches

z axis (normal to x-y plane)

±185-degree rotation, speed variable up to 4 rpm

Film platen

Pressure type

Light source

1,500-watt, variable intensity tungsten lamp

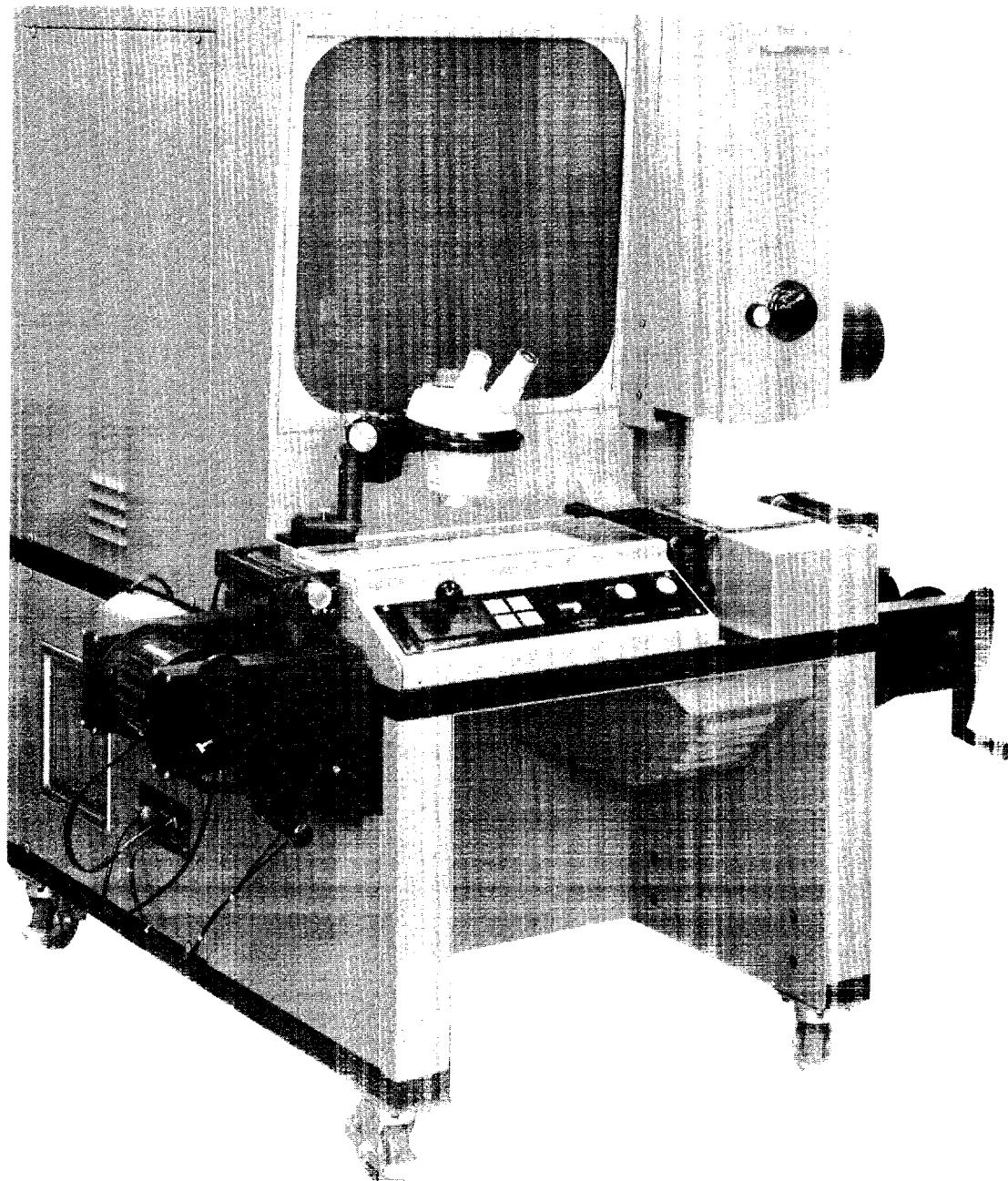
Power requirements

115 volts, 60 hz, single phase, 30 amperes

Dimensions (W, H, D)

42 (34½ with doors removed) by 70 by 90 inches

Rear Projection Viewer (Model 1002)



REAR PROJECTION VIEWER

- Simplified film loading
- Film annotation
- Direct viewing (with microscope attachment)
- Low magnification, rear projection viewing
- 360-degree image rotation

25X1 The ☐ Rear Projection Viewer (currently being developed for the Rome Air Development Center under Contract F30602-67-C-0216) permits rapid screening and target selection of aerial reconnaissance film and other data acquisition films that require quick access editing. The optical system projects the entire width of 5-inch or 70-millimeter roll film at 4X magnification onto a 20- by 20-inch viewing screen at 10 lines per millimeter AWAR (high contrast). A light table located in front of the operator provides direct viewing of film formats as large as 5 by 18 inches. A zoom microscope, movable to any portion of the viewing format, is mounted above the light table and swings away from the viewing area when not in use. The film transport is designed for simplicity and easy film loading and unloading. Scan speed is variable from 2 to 150 feet per minute. Manual film transport is possible by means of handcranks that can be affixed to the supply and takeup spools. The film spool mechanism is removable and can be stored in the viewer cabinet for transport and to facilitate passage through a 30- by 70-inch doorway.

VIEWER AND REAR PROJECTION SYSTEM

The projection system consists of a metallic vapor concentrated arc lamp and condenser situated below the film plane. A folding mirror above the film directs the optical path into the lens system, which images the film onto the screen, leaving a 6-inch open area for annotation. The optical system also provides for image rotation by means of a control linked to a gear train that rotates the image through 360 degrees. Detents are provided at 0 degrees (direction of film transport) and at 90, 180, and 270 degrees.

ILLUMINATION

The light source is a 300-watt metallic vapor arc lamp with a normal operating life of approximately 150 hours. An elapsed time meter monitors operating hours so that lamps can be replaced in accordance with preventive maintenance procedures. Screen brightness is adjusted by introducing a neutral density wedge with a range from 0.15 to 1.15 into the optical path.

DIRECT VIEWING SYSTEM

The direct viewing system is a cold cathode light table with provision for mounting a Bausch & Lomb Zoom 70 or equivalent microscope. The viewing surface measures 5 by 18

inches and the illumination is variable up to 900 foot-lamberts. The light emitted from the table is utilized as the light source for the scanning microscope. A scanning microscope carriage provides effortless scanning of the complete light table and is designed to allow the microscope to swing to the left, off the light table completely, when not in use.

FILM TRANSPORT SYSTEM

Threading configurations have been developed to prevent the emulsion surface from touching the drive rollers regardless of film orientation. A one-axis joystick controls the direction and speed of the film; activation to the right or left moves the film to the right or left, and the speed of film movement is controlled by the displacement of the stick. The film speed is continuously variable between 2 and 150 feet per minute. Sufficient friction is provided to the transport control to enable the film speed to remain constant when the operator releases the control. Provision is made for dust removal and static elimination to maintain image quality. An end of roll sensor is incorporated at the film supply spools and film tension is controlled by means of two torque motors. The film spool mechanism is removable and can be stored inside the viewer cabinet during transport.

CONTROLS

There are 13 controls and indicators provided for operation of the Rear Projection Viewer:

- Input power on-off pushbutton
- Projection lamp on-off pushbutton
- Transport system control joystick
- Automatic — manual transport selector
- Rear projection screen brightness control
- Light table brightness control
- Projection screen fine focus
- Image rotation control
- End of roll override switch
- Film footage readout indicator
- Footage zero reset knob
- Selector switch for reversal of torquers, depending on rotation of supply and takeup spools
- Emulsion up or down selector switch.

With the exception of fine focus and rotation controls, located to the right of the projection screen and the emulsion up or down selector and torque reversal switches located on the secondary control panel on the lower right-hand side of the cabinet, the main controls are located on the front of the console below the light table.

HUMAN FACTORS

The outside dimensions and optical path requirements have been subjected to anthropometric analysis to achieve comfortable and efficient viewing and control conditions.

SPECIFICATIONS

Input film size

70 millimeters to 5 inches, up to 1,000-foot spool capacity

Light table viewing area

5 inches wide by 18 inches long

Magnification

4X

Light source

300-watt metallic vapor arc lamp

Optical system

Folding mirror and K lens configuration

Resolution

10 lines per millimeter AWAR (high contrast)

Viewing screen brightness

40 to 400 foot-lamberts

Light table brightness

Variable up to 900 foot-lamberts

Controls**Transport system**

Joystick

Footage indicator

Digital readout

x indicator

Resettable

x translation

Motorized with provision for manual override

Film transport speed

Scan 2 to 150 feet per minute

Image rotation

360 degrees

Installation data**Operating conditions**

Normal room light

Weight

500 pounds

Power

115 volts, 60 hz, 20 amperes

Dimensions (W, H, D)

50 by 55 by 46 inches (operating);

30 by 55 by 46 inches (for transporting)

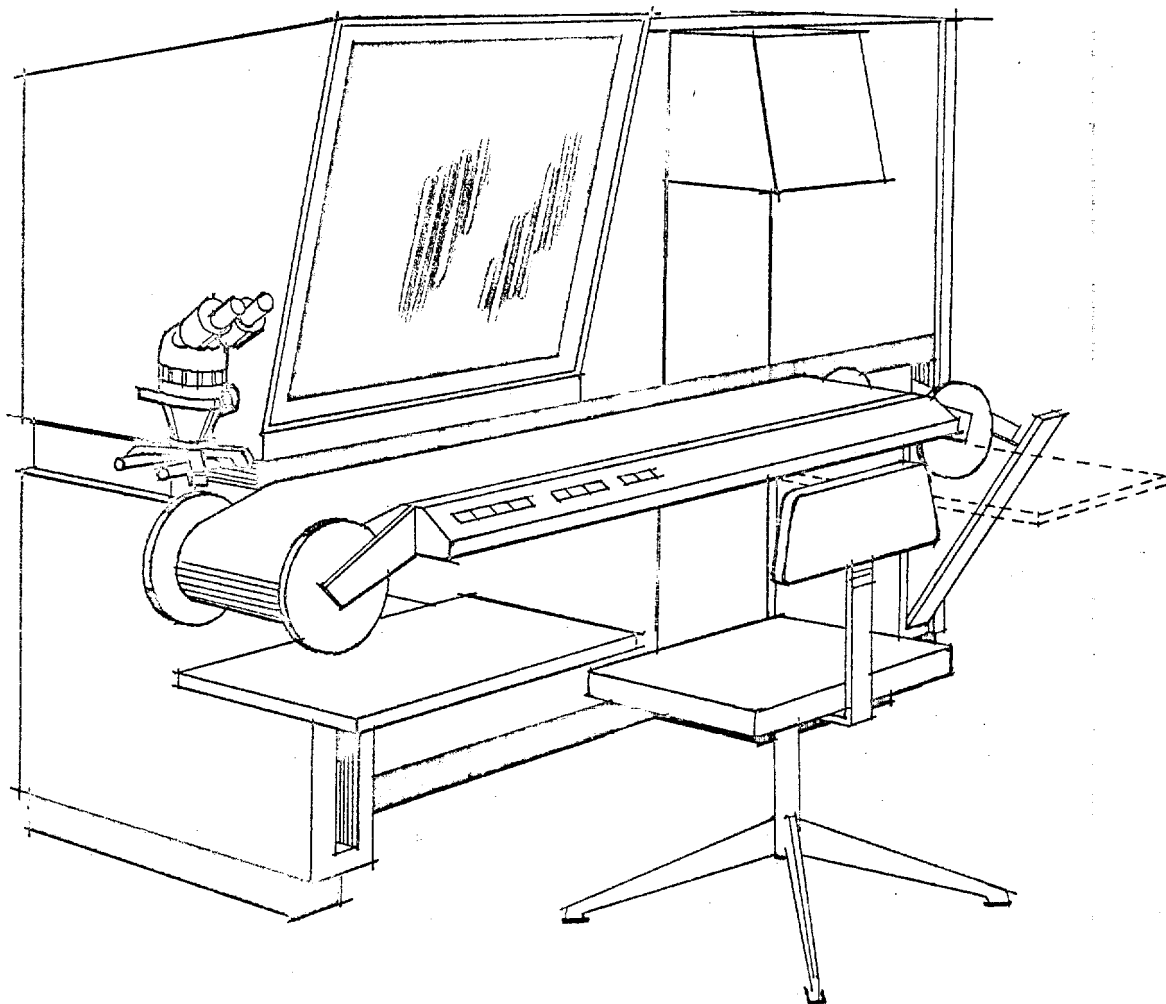


AR-109A Viewer-Printer
Projection, Photographic
(Mock-up, Model 3002)

25X1

file

VIEWER-PRINTERS



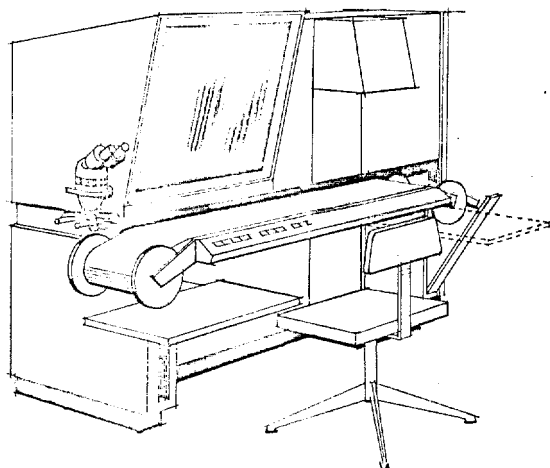
Models

- 3002 Multimagnification Screening Viewer-Printer *RADC*
- 3003 Viewer-Printer
- 3004 Photointerpretation Rapid Copy Viewer-Printer *NPIC*
- 3005 Modified 18-24 Reader-Printer*

*Patent Nos. 3173577, 3240115 and others pending

Multimagnification Screening Viewer-Printer, (Model 3002)

25X1



- Direct viewing
- Multimagnification rear projection viewing
- Detail (microscope) viewing
- Annotation capability

25X1 Multimformat film transport

- Positive printout of screened image

The ☐ MSVP is a specialized item of equipment providing all of the viewing functions required for complete photointerpretation of multimformat input imagery and for operator annotated prints of selected frames within 30 seconds of the operator's print request. The MSVP permits viewing and annotation in three modes: (1) direct viewing, (2) rear projection viewing at 2X, 4X, 7X, 23X, and (3) either stereo or conventional detail viewing with a zoom microscope. Illumination and resolution are extremely high and uniform across the format for all viewing modes. Input imagery in widths of 9.5, 6.6, or 5 inches, and multiweb at 70 millimeters can be accommodated. The printer module permits positive to positive and negative to negative (i.e., reversal) reproduction of any imagery being screened in the rear projection viewing mode. Reproduction is in the form of damp-dry prints of either 10- by 10-inch or 20- by 20-inch size, as desired.

DESCRIPTION

25X1 The ☐ MSVP satisfies the exacting viewing and printing requirements of most present photointerpretation facilities. This instrument comprises two modules: a viewer and a printer.

Viewer

The viewer module features direct, multimagnification projection, and detail viewing; high level illumination and an annotation capability in all three modes; relatively high resolution and uniformity of light distribution across the image format; accommodation of a wide range of input formats; 2X, 4X, 7X, and 23X magnification; full screen viewing at each magnification; automatic or manual exposure control with exposure timer for the manual mode; variable screen brightness control over the range of 40 to 400 foot-lamberts; and operation from a sitting position.

The MSVP meets all viewer requirements through use of an illumination system based on years of experience with ☐ highly successful AM-4 rear projection viewer; a double-fold, high resolution optical system using commercially available lenses and packaged in a console measuring only 48 by 72 by 34 inches; a precision film transport system having a wide range of scan and slew speeds and precise control of film motion at low velocities; precision film support throughout the film path to ensure freedom from film scratching, abrading, or other degradations; front panel operator controls that are human engineered for minimum operator motion and maximum overall operational efficiency in all viewing modes; internal construction featuring high reliability and ease of maintenance; and loading and operation under normal room illumination.

Printer

The printer module, although designed for operational and external compatibility with the viewer of the MSVP, is a customer option in that its elimination will not affect viewer performance other than in recording capability. The printer comprises an exposure platen, intermediate negative film transport, positive film transport, processing assembly, and plumbing utilizing a diffusion transfer printing technique.

DIRECT (LIGHT TABLE) VIEWING

A conveniently located light table at the operator's station permits direct viewing and target selection on the multimformat input imagery. Opaque masks may be translated into position to eliminate excessive glare from any unused portions of the table, whose brightness is adjustable from the viewer-printer's control panel. The light table will be at least 30 inches long and will provide for x and y coordinate readout.

REAR PROJECTION VIEWING

The rear projection viewing system has four individually selectable magnifications: 2X, 4X, 7X, and 23X. With the photointerpreter seated in a normal operating position, the 20- by 20-inch Polacoat viewing screen is at a comfortable viewing angle. Provision is made for operator annotation of any imagery seen in the projection mode.

DETAIL (ZOOM MICROSCOPE) VIEWING SYSTEM

The MSVP is normally supplied with the mount and an X Y stage for microscope translation over the light table, but not the microscope. The mount may be designed to accept either conventional or stereo microscope assemblies. The customer can select such special features as image rotation or any required range of zoom magnification as specified.

ILLUMINATION SYSTEM

The illumination system for the MSVP uses a 1,500-watt projection lamp and a multilens condenser assembly having automatically interchanged lens elements that optimize the condenser for each of the four magnifications.

The MSVP optical system comprises a lens selection assembly, two folding mirrors (one adjustable to allow printout), and a 20- by 20-inch Polacoat rear projection viewing screen.

FILM TRANSPORT SYSTEM

The film transport system accommodates film widths from 70 millimeters through 9½ inches and film lengths up to 1,000 feet. The input film transport allows for control panel operated translation of the input imagery in any of the viewing conditions. The transport system is joystick operated during scanning and slewing. A footage indicator (accurate to approximately 0.1 percent), together with the x and y position indicators enable precise target positioning on the viewing screen crosshairs for high magnification and/or printing. The speed and direction of film movement are governed by the joystick. A bidirectional film motion capability permits the operator to select the required viewing position.

CONTROL PANEL

All controls on the viewer-printer's control panel are positioned for maximum operator convenience and efficiency. Individual controls are provided for each viewing mode.

DIFFUSION TRANSFER REVERSAL PRINTER-PROCESSOR

The optional capability for direct positive to positive print-out of screen images necessitates the inclusion of a processor package placed at the right of the console. This package consists of an exposure platen, an intermediate negative film transport, a positive material film transport, a processing assembly, and associated plumbing. Actuation of the printing and processing cycle is accomplished at the control panel. The output print is within easy reach of the seated operator. Automatic exposure control is provided. However, a manual override allows the operator to select the required exposure parameters. Output print sizes may be either 10 by 10 inches or 20 by 20 inches. The photosensitive intermediate negative is cassette loaded and may be inserted into the equipment under room light conditions. The positive diffusion-transfer reversal material (not light sensitive) may be loaded into the MSVP under room light conditions. The nominal processing time for the output positive is approximately 30 seconds. The system design provides for continuous viewer-printer-processor operation for up to 100 prints, each 20 by 20 inches, without requiring a change of chemical solution. Prints are delivered in damp-dry condition (similar to Verifax-type office copies). The output material must be peeled from the negative material.

MAINTENANCE OPERATION

All maintenance and operating procedures are accomplished from the front of the device. The externally mounted film spools permit convenient front loading and provide the maximum clear work area required for the handling of large format, heavy spools. The projection viewer-printer may be flush mounted against a wall. The condenser and light source for the viewer-printer are located at the lower right of the console; both are easily accessible from the front.

MILITARIZED VERSION

Field operated equipment should be as basic in configuration and construction as is possible without sacrificing its primary purpose. In photointerpretation viewers used primarily

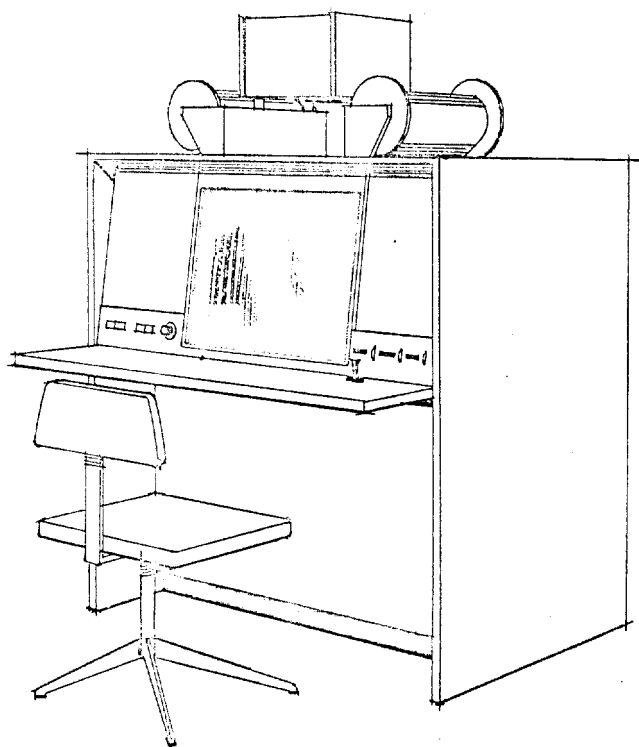
for rapid extraction of intelligence information, it is of little value to save several seconds by automating all controls and then have the equipment unreliable as a result of the added complexity. Therefore, upon customer request, the MSVP will be configured to provide manual control of such functions as lens positioning, lateral film translation, mirror rotation, etc., or manual backup controls for any automatic functions used.

SPECIFICATIONS

Input film sizes	70 millimeters to 9½ inches, up to 1,000-foot spool capacity
Output print size (optional)	20- by 20-inch cut sheets 10- by 10-inch cut sheets
Viewing characteristics	
Magnification	2X, 4X, 7X, 23X* (selectable)
Light source	G.E. 1500T24/15 lamp
Input format	
2X	9 by 9 inches
4X	5 by 5 inches
7X	70 by 70 millimeters
23X	0.9 by 0.9 inch
Lenses	
2X	600-millimeter, f/9 Apo-Nikkor
4X	450-millimeter, f/9 Apo-Nikkor
7X	300-millimeter, f/9 Apo-Nikkor
23X	105-millimeter, f/5.6 Schneider Componon
Resolution at output platen, lines per millimeter	
2X	10
4X	10
7X	10
23X	7
Exposure control	Automatic with manual override
Screen brightness range	40 to 400 foot-lamberts
Uniformity of illumination	Varies by less than 20 percent across format
Controls	
ON-OFF	All circuits energized in the power-on condition
Print (optional)	Pushbutton to initiate printing cycle
Footage Indicator	Bidirectional display
X Indicator	Resettable for each frame
Y Indicator	Nonresettable, ± indication of distance from optical centerline
Magnification Selection	Semiautomatic
Brightness	Variable
Mirror Control	Automatic
Exposure Control	Manual, or automatic
Exposure Timer	Used in "manual" exposure-control mode only
Installation data	
Operating conditions	Room light operation, room light loading
Mounting data	Locking-type caster
Weight	900 pounds
Power	115 volts, 60 cycles, 20 amperes
Viewer dimensions (W, H, D), inches	48 by 72 by 34
Printer dimensions (W, H, D), inches	24 by 72 by 30

*will consider customer requests for replacing the 23X magnification with some other magnification.

Viewer-Printer, (Model 3003)



VIEWER-PRINTER

- Multifformat input roll film viewing
- Multifformat input film chip viewing
- 2X, 4X, 7X, and 10X magnification for viewing and printing
- Image rotation

25X1 10- by 10-inch and 20- by 20-inch negative prints

Model 3003 Viewer-Printer is designed for versatility in meeting a wide variety of military and commercial photographic evaluation requirements.

The unit features automatic lens selection, choice of input film size, full format coverage for high magnification viewing and printing, choice of two negative-film copy sizes, and image rotation capability — all completely controlled by one seated operator.

FILM SIZE

The viewer-printer is designed for projection viewing and printing of 70 millimeter to 9 1/2-inch-wide film mounted on spools up to 1,000 feet in length and multifformat film chips.

MAGNIFICATION SELECTION

Automatic lens and condenser indexing controls provide rapid selection of any of four prefocused lenses for 2X, 4X, 7X, and 10X magnification of the input format onto the 20- by 20-inch viewing screen or the printing platen.

IMAGE ROTATION

Image rotation of ± 185 degrees is provided by mounting the entire input platen on a rotatable circular table driven by a dynamically braked motor controlled from the operator's panel.

NEGATIVE PRINT SIZE

The viewer-printer provides negative prints of 10- by 10-inch and 20- by 20-inch sizes with a changeover downtime of less than 5 minutes. All changeover elements are built in, precluding problems of external storage and handling.

FILM TRANSPORT

The input film transport accommodates 1,000-foot spools of film varying in width from 70 millimeters to 9 1/2 inches. The film is transported in either a scanning mode for continuous viewing and target positioning or in a slewing mode for rapid format selection or rewind. In the scan mode the film is transported by means of a capstan drive whose speed is variable from 0.1 to 5.0 inches per second.

A pair of dynamically braked torque motors is used for forward and reverse direction spool driving, i.e., x-axis position control. Translation in the y axis is accomplished by moving the entire input assembly which is mounted on linear ball bushings and driven by a reversible torque motor through a rack and pinion combination. Orthogonally mounted ball slides allow for translation of the complete assembly along the x axis to allow for film chip scanning.

INPUT FILM PLATEN

The input platen design consists of an electrically operated pressure plate assembly which clamps the film against a reference surface plate for static viewing and printing. The pressure plate is released during film advance. A pair of guide rollers maintain the emulsion side of the film approximately 1/32-inch away from the reference plate to prevent film scratching. To eliminate some of the threading problems inherent in conventional pressure plate designs, the reference plate is hinged, providing complete access for loading and threading the film. After the threading operation, the reference plate is manually returned and securely fastened to the input platen. Elimination of Newton ring interference patterns has been achieved through careful design of the pressure plate.

OUTPUT PRINT STAGE

Output printing is accomplished at a vacuum platen assembly in the base of the viewer-printer console. Upon completion of the exposure cycle, the output stage drive system automatically indexes the spooled film negative supply. The exposure cycle is determined and selected by the operator with the help of the exposure meter probe and selector guide, located on the left side of the control panel.

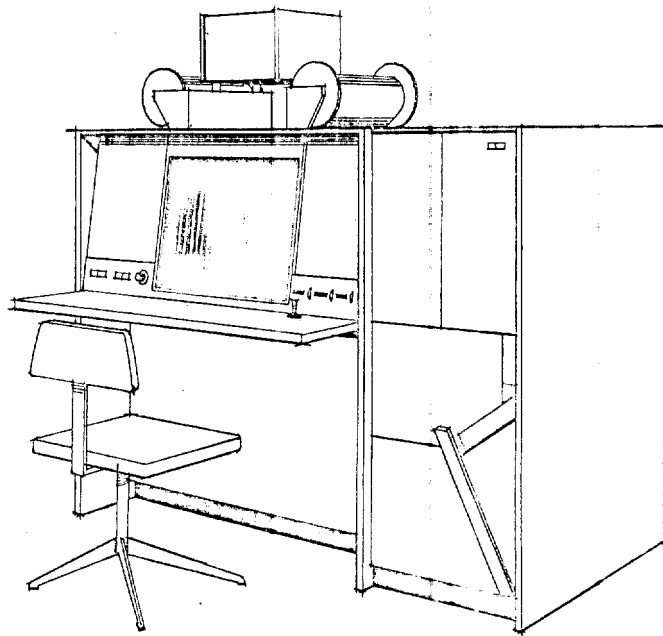
Photointerpretation Rapid Copy Viewer-Printer, (Model 3004)

OPTICAL SYSTEM...

The optical system includes four prefocused lenses and associated condensers which are automatically positioned by the operator. When the operator selects the desired magnification, the correct lens of the lens assembly and the correct elements of the multilens condenser are positioned automatically. For the printing mode, the mirror is hinged out of the optical path, providing a direct light path to the output print platen. A light shield is incorporated to prevent film exposure until the mirror is completely out of the path, at which time the automatic exposure cycle is enabled.

SPECIFICATIONS

Input film sizes	70 millimeters to 9 1/2 inches, up to 1,000-foot spool capacity or film chips
Output print size	10 by 10 inches or 20 by 20 inches
Printing and viewing characteristics	
Magnifications	2X, 4X, 7X, 10X, 20X
Light source	G.E. 1500T24/15 lamp
Input format	
2X	9 1/2 by 9 1/2 inches
4X	5 by 5 inches
7X	2.8 by 2.8 inches
10X	2.0 by 2.0 inches
Lenses	
2X	f/5.6, 300-millimeter focal length, Schneider Componon
4X	f/5.6, 210-millimeter focal length, Schneider Componon
7X	f/5.6, 150-millimeter focal length, Schneider Componon
10X	f/8, 111-millimeter focal length, Goerz Wide-Angle Golden Dagor
Resolution measured at output platen	
2X, 4X, 7X	10 lines per millimeter
10X	7 lines per millimeter
Exposure control	Manual
Viewing screen brightness	40 to 400 foot-lamberts
Brightness control	Panel mounted
Controls	
On-Off	All circuits energized in the "power-on" condition
Print	Push button to initiate printing cycle
Footage Indicator	Bi-directional display
X Indicator	Resettable for each frame
Y Indicator	Nonresettable, \pm indication of distance from optical centerline
Magnification Selection	Automatic
Mirror	Automatic
X and Y Translation	Manual
Installation data	
Operating conditions	Room light operation, safelight loading
Mounting data	Locking-type casters
Height	76 inches
Width	48 inches
Depth	48 inches
Weight	900 pounds
Power	115 volts, 60 cycles, 20 amperes



- Rapid access 10- by 10- or 20- by 20-inch prints
- Multiformat input
- Positive to positive prints
- Choice of five magnifications
- Automatic prefocus
- Calibrated exposure controls

The ☐ Photointerpretation Rapid Copy Viewer-Print25X1 a highly versatile, single console instrument providing rapid access to 10- by 10- or 20- by 20-inch damp dry prints for tactical briefing conferences. The viewer-printer accepts either chip or roll film input photography in standard widths from 70 millimeters to 9 1/2 inches. This imagery is projected at any of five magnifications (2X, 4X, 7X, 10X, and 20X) onto a 20- by 20-inch viewing screen. A two-speed film transport system with y-axis translation capability permits the selection of any portion of the input material for viewing and printing. The printer module employs a diffusion transfer reversal (DTR) process to produce positive to positive prints. All operating controls are conveniently located within easy reach of a seated operator.

OPERATIONAL CHARACTERISTICS

The ☐ Photointerpretation Rapid Copy Viewer-Pr25X1 satisfies the film editing and copying requirements of most photointerpretation facilities. Primary emphasis is placed on simplicity of operation, both in preliminary loading functions and in equipment control and manipulation. Photographically trained personnel are not required for operation and maintenance.

Photointerpretation

Rapid Copy

Viewer-Printer, (Model 3004)

PROJECTION SYSTEM

The projection system consists of a light source, condenser assembly, film platen, projection lens assembly, front surface folding mirror, and a viewing screen. The total optical path is 54 inches. The film image is picked up directly by the appropriate projection lens and is directed to the folded mirror and onto the rear surface of the Polacoat viewing screen. In the printing mode, the mirror rotates 90 degrees, reflecting the image to the printing plane. Five magnifications are provided through the use of five projection lenses and seven condenser lenses.

OPTICAL SYSTEM

Optically, the viewer-printer is a straightforward system. Resolution ranges from 10 lines per millimeter at 2X to 5 lines per millimeter at 20X with commercially available optics. A single folding mirror presents the image in its proper orientation to either the screen or the intermediate negative. The projection lenses (one for each magnification) are all mounted to a common turret, and upon the operator's command are rotated into place. The lenses are prefocused, although a manual fine focus adjustment is provided.

PRINTER-PROCESSOR

The printer-processor section is a self-contained unit located adjacent to the viewing and projection unit. The printer-processor unit consists of a cabinet containing the processor, the solution supplies, the positive paper roll, the power supply, and a light-tight area for holding the laminated positive and negative sandwich. The processor unit is fed from disposable containers. No handling of solutions is ever required.

The cabinet serves as a base to an upper structure containing the negative film supply and the exposure platen. Once the printing mode is activated, the transport mechanism of the processor operates automatically, correctly exposing the image area, advancing the positive and negative material through the processor, and depositing laminated sheets in the light-tight compartment. The sheets are then hand stripped.

FILM TRANSPORT

The joystick operated film transport permits low magnification scanning of input film negatives with provisions for increasing the magnification level for detailed study of particular areas of interest. Bidirectional motion capability is included in the design of the transport in order to move any target area into the center of the screen prior to high magnification viewing. The design provides for rapid traversing in two directions as well as precision motion control for accu-

ately positioning the target area on the viewing screen cross-hairs. The input film transport accommodates 1,000-foot rolls of film varying in width from 70 millimeters to 9½ inches. The film is transported in two modes — scanning for continuous viewing and target positioning and slewing for rapid format selection and rewind. Scan speed is variable from 0.1 to over 5.0 inches per second. Tension is maintained on the film by torque motors controlled by the amount of film on each spool. Movement of the joystick forward or backward releases the plate and transports the film in the direction of joystick movement.

Y TRANSLATION

Y translation of the entire film transport is provided to position any portion of the largest input film over the smallest printing aperture. The film transport and platen assembly are mounted on ball slides positioned laterally to the direction of film transport. Lateral motion is automatically controlled by the motion of the joystick.

CONTROL PANEL

The viewer-printer controls are located on either side of the viewing screen in functional groupings. The left-hand panel controls the viewer-printer functions, while the right-hand panel provides input film positioning controls. Auxiliary controls and indicators consist of low film warning indicators, a print counter, and a ready to print indicator.

ILLUMINATION

To satisfy the illumination requirements of viewing and printing conditions, light intensity is controlled by combining lamp voltage adjustment with a filter wheel introduced at the light source. This combination provides a more than adequate range of illumination for the two modes of operation.

FILM CHIP ACCOMMODATION

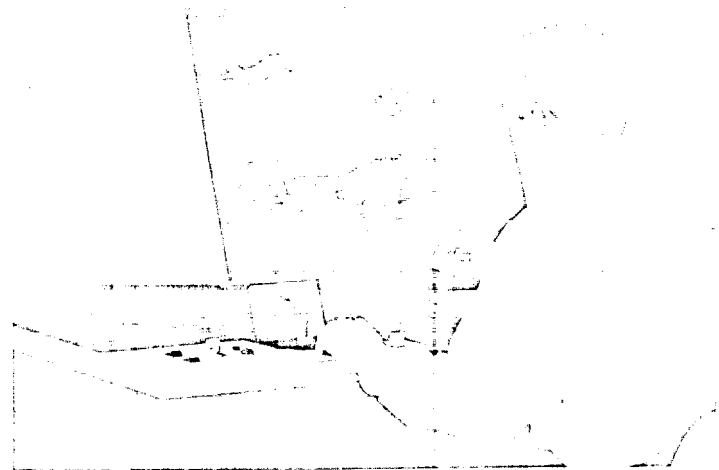
The film platen is positioned on sliding ways to enable the operator to extend it forward for placement of film chips which range in size from 70 millimeters square to 9½ inches square.

PHOTOGRAPHIC CONSIDERATIONS

The printing process is a typical diffusion transfer reversal (DTR) process that produces a positive image from a positive image or a negative image from a negative image. The process is based on the use of a silver halide emulsion that is treated in a developing solution containing a silver solvent. The light sensitive component is exposed and processed in a device that simultaneously laminates the negative component to a nonlight-sensitive component on which a positive image is formed.

Modified 18·24**Reader-Printer* (Model 3005)****APPLICATIONS**

Input film sizes	70 millimeters to 9 1/2 inches wide, up to 1,000 feet long
Output print size	10- by 10- or 20- by 20-inch cut sheet (damp dry)
Magnification	2X, 4X, 7X, 10X, and 20X
Light source	G.E. 1500T24/15 lamp
Input format	
2X	9 by 9 inches
4X	4.5 by 4.5 inches
7X	70 by 70 millimeters
10X	1.8 by 1.8 inches
20X	0.9 by 0.9 inch
Lenses	
2X	300-millimeter, f/5.6 Schneider Componon
4X	210-millimeter, f/5.6 Schneider Componon
7X	150-millimeter, f/5.6 Schneider Componon
10X	111-millimeter, f/8 Goerz Wide Angle Golden Dagor
20X	60-millimeter, f/5.6 Schneider Componon
Resolution at output platen	
2X	10 lines per millimeter
4X	10 lines per millimeter
7X	10 lines per millimeter
10X	7 lines per millimeter
20X	5 lines per millimeter
Printing and processing technique	Diffusion transfer process, positive to positive
Exposure time	Less than 1 second
Exposure control	Automatic
Screen brightness	40 to 400 foot-lamberts
Controls	
On-Off	All circuits energized in the power-on condition
Print	Pushbutton to initiate printing cycle
Footage Indicator	Bidirectional display
X Indicator	Resettable for each frame
Y Indicator	Nonresettable, ± indication of distance from optical centerline
Magnification Selection	Automatic
Mirror Control	Automatic
Brightness	Adjusts screen brightness
Operating conditions	Room light operation, safelight loading
Mounting data	Locking-type casters
Weight	900 pounds
Dimensions (W, H, D)	60 by 60 by 50 inches
Power requirement	115 volts, 60 hz, 20 amperes



- Continuous tone input imagery capability
- Automatic printout in 30 seconds
- Print size flexibility
- Convenient and easy to use
- No handling of chemicals
- 18- by 24-inch rear projection screen

The modified 18·24 Reader-Printer is a self-contained, fixed magnification unit capable of displaying the enlarged images of continuous tone and line film negatives and of rapidly printing and processing enlargements from these negatives. The Reader-Printer accepts aperture cards, acetate jackets, or roll film and accommodates a format size of 58 by 84 millimeters on a 70- by 100-millimeter chip. The image is magnified 6.7X for printing as well as for displaying on the 18- by 24-inch rear projection screen. Other magnifications or multi-magnifications can be supplied upon request.

DESCRIPTION

The Reader-Printer has been designed for convenient operation. The screen inclination and control panel layout permit comfortable viewing from either a seated or standing position, and the handling of chemical solutions has been eliminated through the use of disposable containers.

The printing cycle is automatic and lasts approximately 30 seconds, producing a stabilized photocopy whose dimensions can be varied from 18 by 24 inches to 11 by 8 inches through the use of various widths of roll stock in addition to a built-in print length selector. Furthermore, a masking feature permits cropping the length of the viewed and printed image independently of the length of the print. This feature can save a considerable amount of tracing time by enabling the user to delete selected areas for drafting in revisions prior to reproduction.

FILM CARRIER

The fingertip control film carrier accepts either aperture cards or acetate jackets. Control knobs move the carrier horizontally or vertically for scanning or adjusting the print margins.

*Patent Nos. 3173577, 3240115 and others pending

OPTICAL SYSTEM

The single-lens projection system provides uniformly high definition and illumination over the entire 18- by 24-inch format. A focal wheel permits quick refocus to compensate for minor variations in emulsion position, created by thickness of jacket or reversal of film for production of reverse reading intermediates.

EXPOSURE AND ILLUMINATION CONTROLS

Exposure timing is fixed. The illumination intensity from the fan cooled, 300-watt, 125-volt lamp may be varied by means of a rheostat control on the instrument panel to compensate for variations in film density. Thus the range of reproducible film is broadened and the reproduction quality improved.

VIEWING SCREEN

The screen is a rear projection type, with an 18- by 24-inch viewing area. It is inclined to permit comfortable viewing from either a seated or standing position.

PRINT LENGTH SELECTOR

The length of the print is variable from 8 to 24 inches, the length being set by turning a control dial. An automatic severing mechanism neatly separates the print from the roll at the preselected length. The width of the print is determined by the width of the roll of paper employed.

MASK

When prints with an image area less than 24 inches in length are produced, a mask plate screens off the unwanted area on both viewing screen and sensitized material. The mask may be set at any position by moving a fingertip lever on the control panel. The viewed image and the resulting projected print are identical in content. Calibrations at the bottom margin of the screen show the size of the image to be printed.

PRINT CYCLE

The fully automatic exposure and print processing cycle is initiated by operator control and lasts approximately 30 seconds. During 25 seconds of this time, the viewing screen may be employed for selecting the next image.

PROCESSING FUNCTION

The processing unit is fed from disposable containers. No handling of solutions is ever required. Raising the hinged reservoir automatically fills the processing unit; lowering the reservoir returns the chemicals to the containers for evaporation-proof storage when the Reader-Printer is not in use. The paper feed is automatic. The paper roll is loaded in a desk high storage box, easily accessible by lifting a section of the tabletop.

CONTROLS

The controls are conveniently grouped and located for easy access from either a seated or standing position. They include a power switch, input imagery position controls, fine focusing adjustment, illumination rheostat control, print length selector, mask position lever and calibrated scale, and automatic print cycle start control.

SPECIFICATIONS**Size of viewed image and print**

Variable from 18 by 24 inches to 11 by 8 inches

Maximum image area

17 by 24 inches

Magnification

From 4X to 15X at customer option

Printing time

Approximately 30 seconds

Type of paper

Special negative-positive reader-printer paper (available in document weight or as translucent stock)

Type of print produced

Stabilized photocopy with continuous tone reproduction capability (image may be right reading or reverse reading, as desired)

Power

115 volts, 60 hz, 5 amperes

Dimension (W, H, D)

48 by 51½ by 36 inches

Weight

350 pounds net, 520 pounds gross

For additional information contact:
Graphic Information Systems Directorate

AIR FORCE SYSTEMS COMMAND
ROME AIR DEVELOPMENT CENTER

Specification RADC-5236
10 July 1967

3002 VIEWER-PRINTER

1. SCOPE: This specification covers the requirements for a 3002 Viewer-Printer.

2. APPLICABLE DOCUMENTS: The following documents of the issue in effect on the date of request for proposals, form a part of this specification to the extent specified herein.

SPECIFICATIONS

Military

MIL-E-4158 Electronic Equipment, Ground, General Requirements For

MIL-F-14072 Finishes for Ground Signal Equipment

MS-26565 Spool --- Photographic, Aerial

STANDARDS

Military

MIL-STD-108 Definitions of, and Basic Requirements for Enclosures for Electric and Electronic Equipment

MIL-STD-150 Photographic Lenses

Federal

FED-STD-595 Colors

(Copies of documents required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

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3 REQUIREMENTS

3.1 Components - The 3002 Viewer-Printer shall consist of:

<u>Item No.</u>	<u>Quantity</u>	<u>Description</u>	<u>Requirement</u>
1	1 each	Film Transport System	3.4.1
2	1 each	Direct Viewing Stage	3.4.2
3	1 each	Rear Projection Viewer	3.4.3
4	1 each	Printer	3.4.4

3.2 General Specifications.- The requirements of MIL-E-4158 apply as requirements of this specification. Where the requirements of the general specification and this specification conflict, the requirement of this specification shall govern.

3.2.1 Exceptions and additions to the requirements of MIL-E-4158:

3.2.1.1 Service conditions.- The Viewer-Printer shall be designed and constructed in accordance with MIL-E-4158, with the following exceptions:

Climatic (operating):

a. Ambient operating temperature: plus 4 1/2°C (+40°F) to plus 43°C (+110°F).

b. Relative humidity: up to 95% at 110°F, including condensation due to temperature changes.

3.2.1.2 Fungus resistance.- Materials which support fungus growth shall not be used if such growth can reduce or interfere with the performance level of the Viewer-Printer.

3.2.1.3 Protective treatment.- When materials are used in the construction of the Viewer-Printer that are subject to deterioration when exposed to the specified environmental conditions, they shall be protected against such deterioration in a manner that will in no way prevent compliance with the performance requirements of this specification. The use of any protective coating that will crack, chip or scale with age or extremes of environmental conditions shall be avoided. Particular attention shall be given to optical surface coatings.

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3.2.1.4 Mechanical.- The Viewer-Printer shall be designed, constructed, and properly protected to withstand mechanical vibrations and shock which may occur during transportation via truck or air, and during loading and unloading of the device.

3.2.1.5 Electrical.- The Viewer-Printer shall be designed and constructed to operate from 120 volts, single phase, 60 Hertz alternating current power sources, with characteristics as specified in MIL-E-4158. Consideration shall be given to easy conversion of the power supply to operate from 240 volts, single phase, 50 Hertz alternating current.

3.2.2 Reliability.- The Viewer-Printer shall be designed and constructed such that it possesses a mean time between failure (MTBF) of at least 500 hours, excluding projection lamp failures. Wherever possible, highly reliable, proven components shall be used.

3.2.3 Maintainability.- The mean preventive maintenance time (MPT) shall not exceed fifteen minutes. Access doors shall provide access to mechanical and optical components which may need to be cleaned, serviced and replaced. The mean corrective maintenance time (Mct) shall not exceed 30 minutes, with a maximum corrective maintenance time (Mmaxct) of 90 minutes for 90% of all maintenance actions. Projection lamp replacement shall be from the front of the viewer and shall take no longer than 0.5% of the rated lamp life.

3.2.4 Lightweight materials.- Wherever practical, lightweight, high strength materials shall be used.

3.3 Design.- The Viewer-Printer shall be designed as a multi-magnification rear projection viewer with an annotation and a printing capability.

a. The primary function of the Viewer-Printer is the rapid screening of aerial reconnaissance film with adequate provisions for annotating the imagery while it is in the film gate.

b. The secondary functions of the Viewer-Printer are:

(1) the direct viewing of the imagery by means of light table and auxiliary optics, and

(2) the generation of paper prints of desired portions of the imagery being projected on the screen.

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3.3.1 Human Engineering.- Consideration shall be given to human factors problems, to gain maximum operator efficiency. An operator shall be able to switch easily and quickly from one function to another. Adequate kneespace shall be provided. The Viewer-Printer design shall enable comfortable viewing of the screen, of the light table and through the microscope. The operator shall be able to annotate the film easily while viewing the screen. The Viewer-Printer shall be designed such that personnel training for operation, lamp replacement, and printer loading/unloading shall not exceed two hours.

3.3.2 Controls.- The controls for operating the Viewer-Printer shall be grouped in a functional relationship in accordance with good human engineering practices. Wherever practical, manual controls shall be used. As a minimum, the following controls shall be provided:

- a. Power on/off - control the main input power.
- b. Joystick film transport - controls the direction and velocity of the film in the X (lengthwise) and the Y (transverse) directions.
- c. Film footage indicator - a reversible, resettable counter which indicates the amount of film moved since the counter was last zeroed.
- d. Magnification control - controls the selection of the four magnifications for the rear projection viewer.
- e. Brightness controls - separate controls for the direct and projection viewing stages.
- f. Fine focus control - for quick and effective fine focus of projection viewing.
- g. Image rotation - a continuous control to rotate the projected image ± 180 degrees about the optical axis.
- h. Printing control - a single control to initiate the printing cycle.
- i. Exposure control - selects automatic or manual mode, and enables manual selection of the desired exposure.
- j. Exposure timer - for use in manual exposure control mode.
- k. Multiple print control - allows selection of multiple or single print modes.

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3.3.3 Size and Weight.- For transportation, the Viewer-Printer shall be no more than 90 inches wide, 72 inches high, and 34 inches deep. In the operational configuration, the size shall not exceed 90 inches wide, 72 inches high, and 45 inches deep. The Viewer-Printer shall not weigh more than 1500 pounds.

3.3.4 Transportability.- The Viewer-Printer shall be constructed such that a fork-lift truck can pick it up from the front and the side. Lockable caster wheels shall be provided on the Viewer-Printer. Leveling pads shall be provided to enable the Viewer-Printer to be leveled on a surface tilted up to 5° in any direction.

3.3.5 Compatibility with other equipment.- The Viewer-Printer shall be designed such that equipment placed adjacent to it will not hinder its operation. The Viewer-Printer shall be front loading for film, chemicals, and photographic papers. Common maintenance, such as the replacement of lamps and cleaning of optics shall be performed from the front.

3.3.6 Enclosure.- The enclosure for the 3002 Viewer-Printer shall be drip proof in accordance with MIL-STD-108. Finishes shall be in accordance with MIL-F-14072. The color of type I surfaces (as defined in MIL-F-14072) shall be color no. 25237 (grey) and/or 25184 (light blue) in accordance with FED-STD-595. The color combination shall enhance the operator's perception of the screen and controls.

3.4 Components.-The Viewer-Printer shall meet the following performance requirements:

3.4.1 Transport System.- The motorized film transport system shall accept 70 millimeter (mm) through 9 1/2 inch wide films in lengths up to 1000 feet (10 1/2 inch diameter reels), with film thickness from 2 mils to 9 mils. The transport system shall accept all types of spools as specified in MS-26565 with films wound either clockwise or counter-clockwise, and with either the emulsion side up or down. The transport system shall move the film smoothly and stably in both the forward and reverse directions for slewing and screening operations. Slewing speeds shall be continuous to 150 feet per minute (fpm); and screening speeds shall be continuously variable from 0.25 to 20 fpm. The film speed ranges may be accomplished in two overlapping segments, if required.

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3.4.1.1 Film protection.- The transport system's drive roller(s) shall not touch the emulsion surface of the film, regardless of film orientation (emulsion side up or down). The transport system shall in no way degrade image quality with scratches or abrasions and shall incorporate a capability for dust removal and static elimination.

3.4.1.2 Film loading.- The film transport system shall have a one-minute design goal for loading one roll of film. The maximum loading time for an experienced operator shall be no more than two minutes for one roll of film.

3.4.1.3 Film footage counter.- A film footage counter shall be incorporated into the film transport system. The indicator shall be accurate to at least 0.2 feet or 0.5 percent of the film transported, whichever is greater. The readout device shall be a forward and reverse reading, resettable counter. The readout shall indicate to the nearest 0.2 foot.

3.4.1.4 End of roll sensors.- The transport system shall incorporate end of roll sensors on both spools. These sensors shall cause the film transport system to shut down before the film completely unrolls off the spool. An override shall be provided so that the operator can completely unroll the film off the spool (for unloading and loading film, etc.).

3.4.1.5 Film hold-down system.- A film hold-down system shall be provided to insure that projected image quality is maintained when the film is stationary. The hold-down system shall also enable microscopic viewing of imagery on the light table at magnifications up to 60X. The hold-down system shall not damage the film.

3.4.1.6 Manual back-up.- A manual back-up shall be available in case of transport system failure. The handles shall be approximately three feet apart and shall not require the operator to move from his normal operating position. Change-over from the motorized to the manual film transport system shall not take longer than 15 minutes.

3.4.2 Direct viewing stage.- The direct viewing stage shall be located in front of the screen and shall consist of a light table and provisions for mounting a Bausch and Lomb Zoom 70 microscope. The microscope shall not be provided by the contractor. The table shall be the maximum practical length, but it shall not be shorter than 30 inches. The mounting provisions shall enable stable microscopic viewing on any portion of the light table without blocking the operator's view of the screen. The light table shall have

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flicker-free, variable illuminance from ~~400~~²⁰⁰ to ~~1000~~²⁰⁰⁰ foot-lamberts. Provisions shall be made to mask out the unimaged area when film formats smaller than 9 1/2 inches are used. Honeycomb light baffles shall be incorporated into the light table to reduce glare on the screen and to provide illumination more suited for microscopic viewing. These baffles shall not be visible and shall not degrade the evenness of illumination.

3.4.3 Rear projection viewer.- The projection viewing system shall project imagery from the film transport system onto the rear of a 22 1/2 inch square screen at 2.5X, 5X, 10X, and 20X magnifications. Resolution on the screen shall be at least 10 lines per millimeter AWAR at 2.5X, 5X, and 10X and 5 lines/mm AWAR at 20X (measured with a high contrast USAF 1951 resolution test target in normal room illumination) while the film is stationary. Visual quality resolution shall be maintained when the film is not stationary. ~~Visual quality resolution shall be maintained when the film is not stationary.~~ The luminance of the projection viewer shall be variable from 60 to 600 foot-lamberts at 2.5X and 5X, 60-500 foot lamberts at 10X, and 60-400 foot lamberts at 20X. Variations in luminance between any two points on the screen shall not exceed 40%. No noticeable color fringing shall appear on any portion of the screen at any magnification.

3.4.3.1 Screen.- The screen shall be chosen to provide the maximum viewing angle consistent with brightness and resolution requirements. An anti-reflection coating shall be placed on the front surface of the screen to minimize glare from the light table and room lights, if required..

3.4.3.2 Image rotation.- The projection viewer shall have an image rotation capability of $\pm 180^\circ$ about the optical axis. At the zero degree position, the image on the screen shall move in the same direction as the film on the transport. The rotation control shall have detents at 0° , 90° , 180° , and 270° .

3.4.3.3 Annotation.- The projection viewer shall be designed so that an operator can annotate that portion of the film which is being imaged on the screen. Annotation shall be capable of being performed easily by an operator who is viewing the screen. The annotating space shall be at least seven inches high.

3.4.3.4 Field of view.- At 2.5X, 5X, and 10X, the entire width of 9 1/2 inch, 5 inch, and 70 mm (respectively) film shall be projected on the screen. The capability shall be provided to project any portion of 9 1/2 inch film at the center of the screen at any magnification.

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3.4.3.5 Film gate temperature.- The heat in the film gate shall not damage the film in any way and shall not interfere with annotation procedures. The temperature of film with a density of 2.0 shall not exceed 130°F when it is left in the film gate for two hours at the maximum projector magnification and screen brightness at an ambient temperature of 70°F.

3.4.3.6 Color photography.- The optical system shall be designed to project color photography as well as black and white. There shall be no significant difference in the color of the input imagery and the color of the projected image.

3.4.4 Printer.- A diffusion transfer reversal printer/processor shall be incorporated into the optical system. The printer shall allow direct positive-to-positive or negative-to-negative print-out of the imagery on the screen. The print shall be at the same magnification as the screen imagery, and imagery at the center of the screen shall be printed at the center of the paper. The print image shall not be reversed (mirror image) from the screen image. Resolution of the prints shall be at least 10 lines/mm at 2.5X, 5X, and 10X, and 5 lines/mm at 20X. A minimum of 10 levels of gray from a 20-level target (20 equally spaced density levels covering at least densities from 0.1 to 3.0) shall be printed. Output print size shall be approximately 20 inches square. All photographic materials (i.e., paper and chemicals) shall be able to be loaded into the Viewer-Printer under room light conditions. Loading time shall not exceed 15 minutes. A fully loaded processor shall be able to make a minimum of 100 prints without reloading. The output print shall be delivered to the operator at a convenient location within 30 seconds after the exposure has been made. The prints shall be sufficiently stabilized when delivered such that no deterioration of image quality is detectable for one month.

3.4.4.1 Exposure control.- The printer shall have automatic and manual exposure control modes. In the automatic mode, the printer shall automatically provide the amount of light for proper exposure. In the manual mode, the operator shall control the exposure.

3.4.4.2 Printing cycle.- The printing/processing cycle shall be initiated by a single actuation of the Print Control. The capability shall be provided to operate the printing function for either one print at a time, or multiple prints (each print from a separate actuation of the print control). Upon completion of the final exposure in the print cycle, the image shall reappear on the screen and all interlocks (if any) shall be released.

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3.4.4.3 Ventilation.- Ventilation shall be provided to eliminate chemical odors which may become annoying to the operator or which may damage the film or any components of the Viewer-Printer.

4. QUALITY ASSURANCE PROVISIONS

4.1 Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.2 Classification of tests.- The inspection and testing of the Viewer-Printer shall be classified as acceptance tests.

4.3 Acceptance testing.- The Viewer-Printer shall be subjected to acceptance testing to determine compliance with the requirements of this specification. The acceptance tests shall consist of:

a. Preliminary acceptance tests (see 4.3.1)

b. Final acceptance tests (see 4.3.2)

4.3.1 Preliminary acceptance tests.- The preliminary acceptance tests shall be conducted by the contractor at the contractor's plant and witnessed by authorized representatives of the procuring activity. The preliminary acceptance tests shall consist of all tests as described under 4.5 "Test Methods" of this specification.

4.3.2 Final acceptance tests.- The final acceptance tests will be conducted by the Government using Government personnel and facilities. The final acceptance tests shall consist of all tests described under 4.5 "Test Methods."

4.3.3 Previous acceptance or approval.- Previous acceptance or approval of material by the procuring activity shall in no case be construed as a guarantee of the acceptance of the finished product.

4.4 Test conditions.- Unless otherwise specified, all tests required by this specification shall be made at prevailing ambient temperature and humidity conditions.

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4.5 Test Methods

4.5.1 Mechanical inspection tests.- The Viewer-Printer shall be given a thorough mechanical and visual inspection and test to determine that the quality of all materials and workmanship is in compliance with the requirements of this specification. Particular attention shall be given to the following:

- a. Completeness
- b. Nameplates, identification markings, and labels
- c. Ease of operation of gears, adjustable and sliding parts, thumb screws, controls and switches
- d. Finishes
- e. Welded joints
- f. Check of solder joints
- g. The fit of components in their respective positions
- h. Check of mounting means
- i. Check of lubrication and rust prevention
- j. Check of safety features and interlocks
- k. Loose fastening and securing devices or parts
- l. Accessibility of components and parts for servicing
- m. Cable runs between components including plugs and receptacles
- n. Grounding connections
- o. Overall dimensions check
- p. Weight check
- q. Other visual defects

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4.5.2 Electrical tests.- The Viewer-Printer shall be given all electrical tests necessary to confirm that all circuits are inherently sound and in compliance with the requirements of this specification. The electrical tests shall include, but not necessarily be restricted to, the following:

4.5.2.1 Continuity.- Each electrical component and each cord and cable shall be given a continuity test to ascertain that it is wired and connected correctly and that good electrical contact is obtained.

4.5.2.2 Operating voltages.- The operating voltage at all important points shall be checked for conformance to those shown on the circuit label and schematic drawings. This shall be done with all controls set for normal operation of the equipment.

4.5.2.3 Voltage and frequency variation test.- The Viewer-Printer shall be operated at discrete intervals throughout the range of voltages and frequencies specified in MIL-E-4158. There shall be no degradation of performance of the Viewer-Printer at any point within the specified ranges.

4.5.2.4 Power consumption test.- A power consumption test shall be performed. It shall consist of measuring the following:

- a. Power consumption (volts, amperes, and power factor)
- b. Total heat dissipation (in BTU's per hour).

4.5.3 Performance tests.- The Viewer-Printer shall be given all performance tests necessary to confirm that the equipment meets the performance requirements specified herein.

5. INTENDED USE: The Viewer-Printer will be used in fixed (i.e., not mobile) reconnaissance exploitation facilities such as the 548th RTS, Hickham AFB, Hawaii; 13th RTS, Clark AB, Philippines; and the 67th RTS, Yokota AB, Japan. It will be used for screening, annotation, interpretation, and reproduction of original negative and duplicate positive aerial photography in roll form. It is intended that the rear projection viewer portion of the Viewer-Printer will be used for initial screening and first phase (flash/hot/immediate type) photo intelligence reporting. The direct viewing stage will be used for second (mission review type) and third (detailed type) photo intelligence reporting in conjunction with the rear projection system. The annotation capability in the film gate will allow quick copying of annotated targets for briefing materials, target folders, and additional interpretation by other photo interpreters.

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